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ASK

INTERVIEW

Bill Townsend



ASK Magazine • Issue Twenty-One

SPRING 2005



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MAKING RELIABLE PROMISES

HOW TO CONDUCT EFFECTIVE REMOTE MEETINGS

SHARING KNOWLEDGE, THE APPL WAY

STREAMLINING THROUGH COMMUNICATION

A CONSERVATIVE APPROACH TO RISK MANAGEMENT



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The NASA Academy of Program and Project Leadership

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It's an important management role:
evaluating people and assessing their needs and capabilities,
and then placing them in a situation where they can
get the necessary tools and experience.

—Bill Townsend, from his *ASK* interview (p. 42)



ON THE COVER The Aura spacecraft launches from atop a Boeing Delta II rocket at Vandenburg Air Force Base in July, 2004.

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Welcome to the Academy of Program and Project Leadership (APPL) and *ASK Magazine*. APPL helps NASA managers and project teams accomplish today's missions and meet tomorrow's challenges by providing performance enhancement services and tools, supporting career development programs, sponsoring knowledge sharing events and publications, and creating opportunities for project management collaboration with universities, professional associations, industry partners, and other government agencies.

ASK Magazine grew out of APPL's Knowledge Sharing Initiative. The stories that appear in *ASK* are written by the "best of the best" project managers, primarily from NASA, but also from other government agencies and industry. These stories contain knowledge and wisdom that are transferable across projects. Who better than a project manager to help another project manager address a critical issue on a project? Big projects, small projects—they're all here in *ASK*.

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ASK ONLINE
http://appl.nasa.gov/ask









Knowledge, for the Taking

Immature poets imitate; mature poets steal

—T.S. Eliot

TRUE, I'M A WRITER, BUT THE KNOWLEDGE SHARING Initiative has taught me that the same sentiment applies for project managers: Take from the lessons and accomplishments of the best. And we're not talking imitation—there is no flattery here—this is all-out thievery. Make someone else's story your own story, make someone's lessons learned your own. Gather all the tidbits of best practices and leadership to become integral parts of your own project management style, not to be goals you strive to reach. Take knowledge, live it, and claim it as your own.

The first time you do it, you might look over your shoulder a little. There might be some guilt attached to learning from the stories of the best of the best and slipping the lessons quietly into your proverbial pocket. In Larry Goshorn's article, *Knowledge Stealing Initiative*, he describes this coming-to-terms with Knowledge Sharing. The difference between that and a misdemeanor? NASA's Academy of Program and Project Leadership (APPL) Master's Forum presenters, workshop participants, and storytellers—they want you to use their stories and lessons and experiences! They are holding them out to you, leaving them unattended with your name on them, hoping you won't have to stumble down the same difficult roads if they could just hand you their conclusions.

You're already familiar with most of the ways that APPL works with project managers like you to get knowledge out there for the taking. In future issues you'll see how we're continuously changing to make sure you always get the valuable information that you need. During the coming months we'll introduce you to experienced project managers who are joining *ASK*'s editorial staff to add relevance and credibility to its stories. In 2005, we'll begin a quarterly publication schedule allowing us to add more stories, more practices, and more knowledge in each issue for you to pillage.

In this issue of *ASK* alone you'll find out how applying Earned Value Management to projects can help turn them around. You'll read the lessons one retired NASA PM learned throughout his career and see how far project management at NASA has come over the years. You'll absorb the knowledge that many people on a project have to offer and how to balance work and family during collocation. You'll find an illustration meant to stimulate discussion about APPL's Knowledge Sharing Initiative. And that's just what you'll see in print...

Go to the APPL website and you'll find much more knowledge to steal. (Of course, we prefer to call it collaboration.) Search the *ASK* archives for the many lessons of issues past. Take a look at the Master's Forum stories and slides, and experience them without stepping foot out of your office. Click on links to other project management resources—most recently we've established a content-sharing relationship with GovSig's online publication—and see what's going on in project management beyond the world of NASA.

It may seem a little counterintuitive at first—we're told plagiarism is punishable and identity fraud even worse! But fight these urges to play it safe. Use the many resources that APPL makes available. Grab what you can, slap your name on ideas that were someone else's first, call up a story as if it were part of your own project management past. Start here and now with these very pages. And if you're still feeling guilty, make sure no one is looking. •





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Knowledge and Meaning through Visualization

The soul never thinks without a picture
—Aristotle

THIS ISSUE FEATURES A VISUAL DEPICTION OF THE ACADEMY of Program and Project Leadership (APPL). I imagine a variety of initial reactions to the drawing. One might be, "What is a cartoon doing in a magazine about project management?" Or perhaps, "Wow, nice colors—and fun." Another may be to closely search the image for signs, symbols and meaning. Still another, to read a new level of innovation and creativity into the picture. Undoubtedly, some readers will raise questions about the cost.

Of course, any reaction is a sign of engagement. The stronger, the more energized the emotional and cognitive processing, the better. It is a sign of attention and interaction. For I've heard it said, "You only need to worry if they don't care one way or the other." So what is the point of the picture?

To stimulate interest, raise questions, promote discussion, and maybe raise a smile...That, at least, was my initial reaction when I was introduced to the work of Nancy Hegedus, who helps to create these drawings for Root Learning Inc. At the NASA PM Conference, I was first shown the work Nancy had been doing with the help of Goddard's Knowledge Management Architect, Dr. Ed Rogers. I was immediately drawn into the power of visualization as a tool for more effective learning, communicating, and conveying complex knowledge concepts.

We need new tools in today's world, where information and data overwhelms by sheer volume. There are articles, pamphlets, communications, and white papers—all aiming to convince and influence. Reactions to these tend to be either avoidance or mind-numbing, heavy-eyed consent; the message never registers or enters the soul. That's one of the reasons that APPL's Knowledge Sharing Initiative (KSI) has turned to storytelling as a memorable way of transferring knowledge, inspiring imitation of best practices, and spurring reflection. *ASK Magazine*'s recent fourth birthday marks an important milestone in APPL's continuing quest to provide ongoing support to project managers and to promote mission success.

And similar to storytelling, the power of visualization is receiving increasing attention in recent years as a way to stimulate engagement. Pictures and visual graphs are viewed as one of the most effective ways for displaying, describing, and generating discussion about quantitative and technically complex information.[1] Prototypes, models, and simulations are considered essential for stimulating innovation through open and engaging discussions.[2] There has also been extensive writing on the use of visual graphics, pictures, and cartoons to facilitate memory, creativity, openness, attention—and even well-being.

For many of these reasons, I am excited to have a colorful visual depiction of the APPL world included in *ASK*. Without the addition of text or slides, the intent is to invite people into the world of the APPL mission—as well as its products, services, customers, and partners—in a fun and engaging manner. As project leaders strive to find ways to encourage engagement, learning, and transmission of knowledge, traditional technologies are proving to be as valuable as modern technologies. (But for those who want more information in the form of texts and slide presentations, we certainly have an abundance of those as well.) •

[1] *Tufte, Edward R. 1997,* Visual Explanations, *Graphics Press.*

[2] *Schrage, Michael. 2000,* Serious Play: How the World's Best Companies Simulate to Innovate, *Harvard Business School Press.*

OLD JOURNEY, NEW HEIGHTS

By John Del Frate





IF YOU COULD SEE THE ROAD AHEAD, YOU MIGHT JUST PASS up a fantastic opportunity because you're blinded by the potential pitfalls. In my case, I was testing the project management waters at the NASA Dryden Flight Research Center after ten years of being a research engineer. I was an eager (but ignorant) rookie project manager (PM) and I was willing to engage in just about any project without knowing what it would entail. The assignment I accepted was to help NASA's Environment Research Aircraft and Sensor Technology (ERAST) Project, a partnership with a fledgling Uninhabited Aerial Vehicle (UAV) industry, to tackle stratospheric flight. I remember one of our industrial partners querying me about whether or not I understood what I was getting into. Like one of those bobble-head toys that have become quite popular, I nodded. But in reality, I didn't have a clue. His response was, "Hang on, it's going to be a wild ride." He was right.

In retrospect, if I had clearly understood the ten years of pitfalls that were coming, I might not have "hung on." Now I can look back and say that I would not trade the experience for anything.

The lows included the destruction of a number of UAVs on my watch. Later someone told me that we should not be surprised if we lost one UAV for every ten flights. We wrote many chapters in the book on what can go wrong with UAVs—and we are still writing. As you can imagine, each mishap was accompanied by an investigation. What an education!

But as bad as the lows were, the highs were stratospheric. We set a number of altitude records with the UAVs, and we performed a number of "first-of-a-kind" demonstrations with payloads. The highlight for me was the world altitude record we set in 2001 with the Helios aircraft on the Hawaiian Island of Kauai. We conducted our flight operations there, flying to a record altitude of 96,863 feet—10,000 feet higher than any non-rocket propelled aircraft has ever gone. We did it on the power of the sun, and it was an unforgettable experience.

The lowest low followed two years later, when we crashed this magnificent aircraft. So, I shared in both the glory and the humility that surrounded the ERAST project.

For the ERAST effort, we had a small, close-knit team—an alliance—that partnered with different small companies and consultants. I viewed our collaboration as a partnership with these entities, as they were not contractors per se. We were working together under something called a Joint Sponsored Research Agreement (JSRA). It is a form of a NASA Space Act Agreement which is rarely used by NASA but provides a lot of flexibility. In this case, it allowed me to work closely with some very special people. We structured our agreement such that all work done by the various partners was done on a non-profit basis with each of the partners providing some cost-sharing.

I learned some valuable lessons from this remarkably diverse group of talented and committed people who are largely responsible for making the ERAST project—and more specifically, the Helios project—a success. I would like to share a few of the lessons I learned, lessons I will take with me throughout my career.

LEARN FROM THOSE BEFORE YOU

Jenny Baer-Reidhart, the first ERAST Project Manager, displayed an enormous amount of courage. Some of the things she did to make the program a success required her to be bold and innovative. Because we were doing

Everything we are doing today is a

things differently, she often took heat and had to fight to stay the course. She always held her ground.

She also had the ability to see the big picture. She created a work environment conducive to getting the job done and secured the funding, the company associations, the places to fly, and the vehicles. Without her, the project never would have enjoyed the successes we did. There were lots of people involved, but Jenny really provided the leadership we needed. I learned an immense amount from her skills and strength as a leader.

YOU'VE GOT TO EMPOWER YOUR TEAM

Ray Morgan was (at that time) the Vice President of AeroVironment, the company that was our partner on Helios. He had been an ardent micromanager. A couple of years before ERAST came around, he realized that his management style was killing both him and his division. In order to survive, he decided to change himself and his division by managing a 180-degree turnaround. By the time this recovering micromanager and his team joined the ERAST alliance, Ray had empowered his team in such a way that they confidently used the strength of the entire team to make key decisions.

After his transformation, Ray would participate in the decision-making process, but he no longer steamrolled the team by saying, "No, it has got to be done my way." He was always willing to let anyone on the team have their say and to let the team processes dictate how a decision would be made. It was really inspiring to see the benefits of this type of management. Everyone had the resources, the responsibility, and the authority to do what they needed to do. As a result, we progressed very quickly and very efficiently.

TRUST IS HUGE

I learned a lot from my relationship with AeroVironment, specifically from two people, Bob Curtin and Kirk Flittie. I wish everyone could have the opportunity to work with contractors that they trust the way I trusted these guys. Usually, with the government contracting structure, we spend an inordinate amount of time and money simply because we don't trust the contractor. There is probably a reason for every process or regulation used to govern them, but they seem ridiculous and wasteful to me. I started out treating the industrial partners like "contractors," but they soon earned my trust and respect. And it paid off for both the government and the industry partners, as we were able to do more technology development at a set level of funding.

Not having to constantly monitor the contractors meant a much leaner operation; we were able to work smarter and faster. But we didn't throw the necessary checks and balances out the window. Instead, we used them at a level that allowed us to pour far more concentration into getting the job done. And because of the trust we'd established, I knew that our partners always had the best interest of the project in mind. I didn't have to always look over their shoulders to make sure the job was done right... ultimately we had the same goal.

DON'T TAKE "NO" FOR AN ANSWER

One of our independent consultants to ERAST was Dale Tietz, a very tenacious fellow. He is the type of guy that just does not take "no" for an answer. If the front door is closed, he asserts, "Try the back door." And if the back door doesn't work, "Try the windows." That's how he is.

He's also the kind of guy who has a very thick Rolodex. He can walk into a meeting, and before long he is friends with everybody and scheming ways of taking advantage of the strengths of those in the room. Having a guy like that on your team adds a very special dynamic. He is constantly evaluating people and situations, and is willing to do whatever it takes to get things done. Watching him, I learned that project managers need to be tenacious—even when you are doing the right thing, doors will close—so you must never give up.

STATE "THE MESSAGE" QUICKLY AND CONCISELY

Somewhere along the way it occurred to us that we needed help making the right kind of project information available to the public. Now, I've never heard of another NASA Project bringing in a "publicist" to help, but that is exactly what we did. Pete Jacobs became our publicist. He would pop in and out, but when he popped in, it was because we were on the brink of some tremendous flight accomplishment. He taught us the importance of "the message." He taught us to use words that could be



small step along that larger journey.

remembered by children, the media, decision makers, or the average Joe on the street. He wanted us to get that message out but also to get it right. He pointed out what should have been obvious: Stakeholders or the media don't have the time or capacity to absorb a longwinded technical speech. Fifteen seconds to say what you mean and say it right may be all you're going to get—especially if you're on-camera.

I think that engineers, like myself, tend to really over-complicate things. We see the nuances in everything. People are always telling us to keep it short and make it consistent. Pete had us working on getting it down to short, concise statements that packed a lot of punch. He wanted everyone on the team to be able to give the same message. We were skeptical that there was any value to this exercise, but Pete was good and achieved unprecedented results. So as an engineer, whether I liked it or not, I learned that it's vital to say it right—and to say it concisely.

KEEP THE IMPORTANT THINGS IN PERSPECTIVE

This was the most personal lesson learned, but also the most important. By the time we were in the 2001 deployment with Helios, my wife came to me and said, "I think your work is more important to you than our family." I thought, "No way," and I argued with her quite a bit. I knew I had a pretty strong work ethic, but I thought that my family rated a much higher priority.

I was convinced I was right, so as far as I was concerned it was a dead issue. But a couple of weeks had gone by when I made a decision that clearly favored work over family, and my wife was quick to call me on it. The bottom line was that even though I said that my family was the most important, whenever there was a conflict between my work and my family—work always won. If there was a scheduling issue, work always won out over my family. But I had become blind to this. I thank God that I started to see the light sooner rather than later, as it was hurting my marriage and my family.

Of course realizing you have a problem doesn't fix the problem, but it's a start. I knew that I had to really make an effort to show what my "top" priorities are. It's an ongoing struggle for me, especially when I, like most PMs, don't have the ability to turn work off when I leave the office. It's easy to let things get out of perspective. I always understood that some things are more important than work. But I learned that I need others—especially my wife—to help me judge how well I am doing.

Part of keeping things in perspective is the ability to see an individual project as a step in a larger, ongoing journey. More than a hundred years ago, the Wright Brothers took a huge step: They convinced the world that we could actually achieve "heavier-than-air" flight. Their work built a foundation, one that those of us working in aerospace have been able to add to and build on.

Our journey consists of taking steps based on prior steps, learning lessons based on the accumulated lessons of those who have gone before us. Everything we are doing today is a small step along that larger journey. These are the small lessons that have helped me shape and characterize my part in the long journey. They are the small road signs that I have posted for those who follow me. •

Lesson

• Make it a regular habit to reflect on your experiences, to develop "small" lessons, and to share them with your peers.

Question

Is embracing a philosophy of "ignorance is bliss"—that is, believing you are better off not knowing the detrimental factors beyond your control—the right attitude for only rare situations, or should it be applied systematically?



JOHN DEL FRATE has ten years of project management experience with the development and flight testing of Uninhabited Aerial Vehicles (UAVs). This work was done under the Environmental Research Aircraft and Sensor Technology (ERAST) Project. Currently, he is Project Manager for the High Altitude Long Endurance Remotely Operated Aircraft (HALE ROA), a NASA Vehicle Systems Program Sub-Project which will continue the development of UAVs for use in the stratosphere.



THE MORE TIME I SPENT AT JOHNSON, THE MORE I REALIZED HOW EFFECTIVE IT WAS TO ACTUALLY COLLABORATE IN PERSON.

ESTABLISHING A PRESENCE

BY JEFFREY MCCANDLESS

THE SPACE SHUTTLE COCKPIT

The Space Shuttle was developed in the 1970s using technology that was quite advanced for its time, including fly-by-wire components and multiple computer screens in the cockpit. Although the electro-mechanical gauges and cathode ray tube (CRT) screens soon became dated, no major upgrades were made to the cockpit for two decades. Part of the reason was simply that the original equipment was extremely reliable. However, it was also bulky and expensive to maintain. A glass cockpit was implemented in the shuttle to help remedy the obsolescence of many of the electromechanical gauges and dials, but that upgrade did not resolve the human factors and usability drawbacks of the cockpit displays. In part to address these deficiencies, NASA is developing a usability oriented modification called the Cockpit Avionics Upgrade (CAU). A key goal of the CAU project is to redesign the displays to improve the crew's understanding of the on-board systems.

WHICH BRINGS US TO ME

In the fall of 1999, one of my managers at NASA Ames Research Center said, "There's a great new project going on at Johnson Space Center (JSC). They're upgrading the shuttle cockpit displays. How would you like to spend two weeks at JSC learning about it, then you could participate via telecons." I said, "That sounds great, but I have to talk to my wife. I already do a number of trips each year. I've got to balance this out and still keep this ring on my finger." It turned out that my wife was quite understanding. I already made a number of conference trips each year, so a two-week trip didn't seem too excessive.

WE NEED YOU HERE

When I talked with folks in person at JSC, they told me candidly, "Two weeks down here is great, but we'd really like you a bit more. Like every other week. For at least one year. What do you think?"

Uh oh. I realized they were right. The project seemed fascinating, but somewhat demanding. So back I went back to my wife—flowers in hand—and told her about this great opportunity. It was clear that I married the right woman. She said, "Go for it. But don't be leaving home every single week!" I promised that I'd be home every other week plus every weekend, and I kept my promise. In actuality, the trips down to JSC were typically from Monday to Thursday, every other week. The project blossomed, and over the last five years I've made dozens of trips to Johnson to work with astronauts, trainers, engineers, mission controllers at others at JSC.

WORKING SIDE BY SIDE & FACE TO FACE

This was very much a team effort, and it was quite helpful that I was present as much as I was. Typically, small groups of 5–10 people would work on a new display for a several-month period, and the co-location factor allowed for unscheduled, informal communication. Being there in person helped to reduce ambiguity surrounding decisions, speed up the project in terms of information exchange, and develop a team persona in which we were really aware of each other's strengths and weaknesses.

FOR ME, THE BASIS FOR THIS SUCCESSFUL COLLABORATION WAS FACE-TO-FACE COMMUNICATION.

The more time I spent at Johnson, the more I realized how effective it was to actually collaborate in person. Every time I had a question or needed assistance, there was someone who could help. They were happy to give me one-on-one support and training. If I was going to work in one of the space shuttle simulators and needed to understand the crewmember's roles during a malfunction, it was easy to find an astronaut trainer who would sit down with me. Without exception, the folks there were helpful and enthusiastic.

And because of the many alliances I had from splitting my time between the two centers, I was able to keep Ames folks fully updated as well. A number of us made trips down to JSC to help support this project; one trip was made to address color characteristics of the shuttle cockpit screens. We collaborated well and were able to put together quite a few display formats. I remember thinking that the "One NASA" theory really held true on this project.

DIFFERENT MEASURES OF SUCCESS

For me, the basis for this successful collaboration was face-to-face communication. Though it was sometimes stressful being on the road so much, I really learned the importance of being present to work together and ask questions in person. Another measure of success was that in the midst of this project and traveling, my wife and I managed to start a family. My oldest boy got a real kick out of visiting Space Center Houston when he was two to learn all about the "face futtle" which "goes way up in the sky." •

Lessons

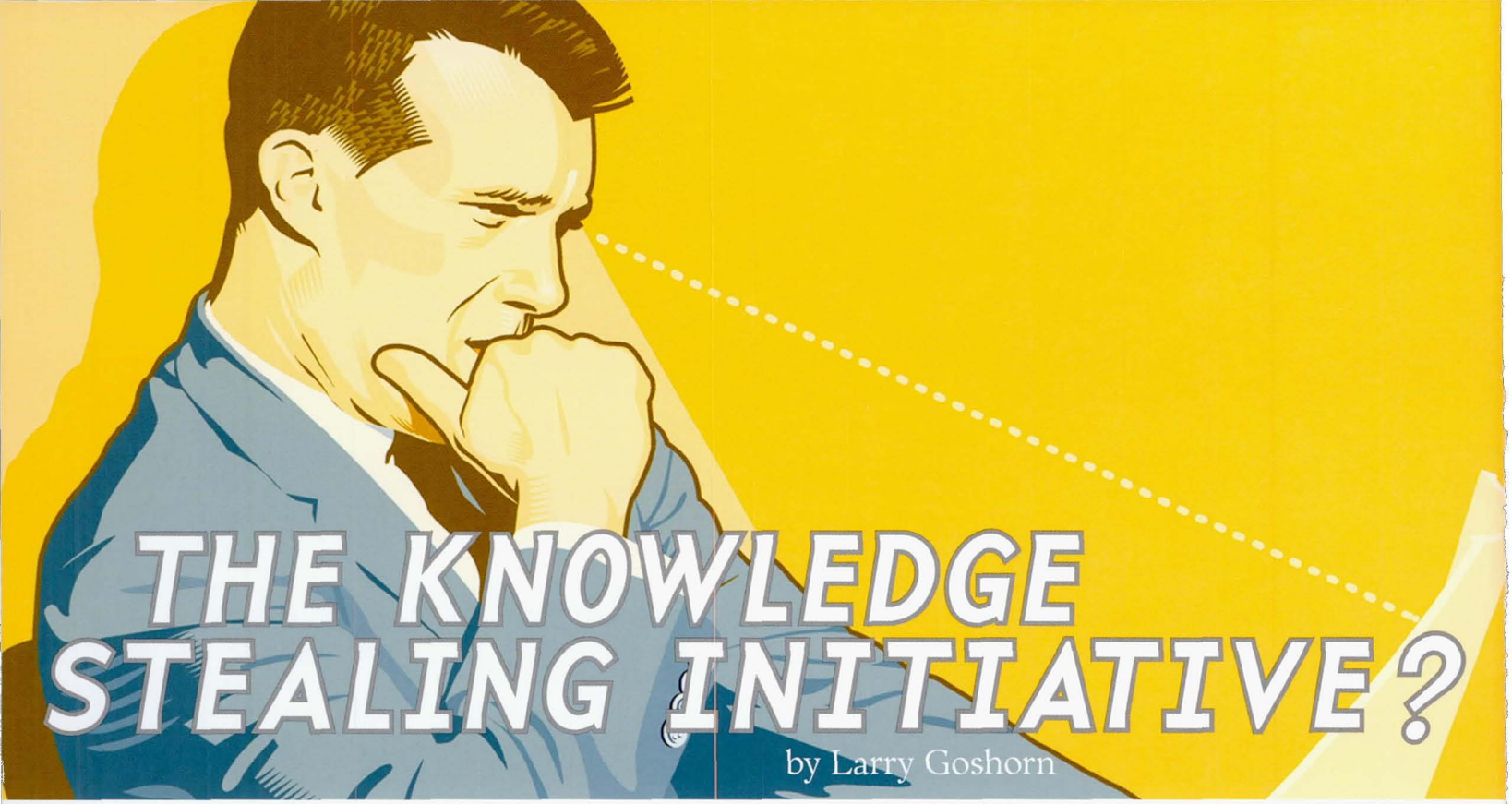
- When practical, collocation and face-to-face communication on a project eliminate misunderstandings, establish relationships, make information more easily accessible, and promote a team atmosphere.
- Compromise is key to balancing both family and career goals. Knowing when to prioritize each is important to success in both aspects.

Questions

Is compromise really the way, and is it even possible in today's competitive environment? Or is alternation the key—periods of putting work first, followed by periods of overcompensation at home?



DR. JEFFREY MCCANDLESS began work at NASA Ames Research Center in 1996 developing image processing algorithms for advanced aircraft. Since 1999, he has been the Co-Lead of the Human Factors Team for the Space Shuttle Cockpit Council, which is responsible for designing and evaluating new shuttle cockpit displays.



THE KNOWLEDGE STEALING INITIATIVE?

by Larry Goshorn

I HAD NEVER THOUGHT OF MYSELF AS A THIEF, BUT THERE I WAS, PEERING AT STUFF THAT CLEARLY WASN'T MINE AND QUIETLY SLIPPING IT INTO MY "TOOLBOX" FOR MY OWN PERSONAL USE. IT WAS BROAD DAYLIGHT, AND I WAS IN PLAIN VIEW OF A LEAST A DOZEN PEOPLE. THE AUDACITY!

AT LEAST THAT'S HOW IT FELT TO ME INITIALLY. I HAVE the honor of being on the Academy of Program and Project Leadership (APPL) Knowledge Sharing Feedback and Assessment Team (FAA), and as such, I am privileged to receive the feedback written by many of you as attendees of the Project Management (PM) Master's Forums. It is the intent of the FAA Team and APPL leadership to use this feedback as a tool for continuous program improvement.

As a retired (sort of) PM in the payload contracting industry, I'm a big supporter of NASA's Knowledge Sharing Initiative (KSI), especially the Master's Forums. I really enjoy participating in them. Unfortunately I had to miss the 8th forum in Pasadena this past Spring, but I did get the feedback package for the Assessment Team work. So here I was, reviewing twelve pages of comments, reflections, learning notes and critiques from attendees of the 8th forum.

THE EYEWITNESS ACCOUNTS

The FAA's mission is to find the positives and negatives in the feedback and compile them for discussion. Shortly into the process of reading the comments, however, my mission changed. I found myself progressing through the feedback, agenda item by agenda item, and actually attending the forum vicariously through the feedback writers! I became engrossed in the content. I felt as though I was blindfolded at a fast-moving sporting event and the play-by-play was being described to me by many others around me.

The feedback was incredibly detailed and well written, complete with application notes, doubts and potential pitfalls. Not surprisingly, I found myself learning rather than reviewing! I was actually taking away knowledge, forming opinions of my own, and developing questions, as though I had been sitting right there! That's why I initially felt like a thief. Actually I was experiencing remote learning, not only from the original forum presenters, but also from the feedback writers.

CAUGHT RED-HANDED

I myself have "stolen" lessons from various storytellers and practitioners that have participated in APPL's programs over the years. I took the importance of storytelling as a means of conveying lessons learned—and also ways to implement this tool with a program team—from Annette Simmons's *ASK* 18 Special Feature, "Dressing up the Naked Truth." From Dr. Gary Klein, a keynote speaker at the 7th Master's Forum, I discovered the use

"WE DON'T HAVE TO BE THERE TO LEARN FROM IT. THE AVAILABLE MATERIAL ALONE IS VERY USEFUL."

of "pre-mortems" as risk identification tools to help a team communicate effectively with a shared risk management philosophy. I learned ways to spot the predictors of successful program management behavior during the selection interviewing process from *ASK* feature writer Scott Tibbitts's article, "Tell Me About Your Lemonade Stand," which appeared in *ASK* 18. And these are just a few of the things I've taken away with me.

As for the feedback accounts, it's clear that the 8th forum was a huge success. As I reviewed the agenda topics, then read the presentation slides and the feedback, I found many of the common themes that always surface when Program/Project Managers get together to discuss successes and failures. A few of these common success factors were: effective communication both inside and outside your project team;the fact that "people" management— rather than "technical" management—is the most important factor for overcoming adversity; and the argument that leadership is founded on the principles of interpersonal relationships—including mutual respect, trust, open communication, and the creation of an environment that encourages new ideas and personal growth. And even though these are repeating success factors, there are always new stories, new thoughts, and new shared experiences dealing with their successful application.

But my review of the forum material and feedback also revealed some newer topics as well. This knowledge, too, I snatched up like the proverbial starving squirrel after the world's last acorn; into my own PM toolbox they went! This included thoughts and concepts such as "the conductor does not make any noise, but gets the best possible music out of the orchestra." I learned new ideas for motivating teams and individuals and reflected on a debate about intrinsic vs. extrinsic motivation. I also read about the increasing importance of coaching and mentoring with notes for effective implementation of these concepts, the use of Test Readiness Levels (TRL) for managing Software project risk, considerations for establishing pro-active "coyote teams" versus re-active "tiger teams" and more.

LIKE TAKING CANDY FROM A BABY

This exercise in remote learning has been valuable to me. It has provided many new ideas for me and reinforced existing project management success concepts. It has illustrated to me, and hopefully to you, that we don't have to be there to learn from it. The available material alone is very useful. Coupled with the excellent feedback from the gracious attendees, it was almost as good as being there!

And the folks at APPL are great at keeping the forum agendas and the presentation packages on their website, which can be accessed according to the forum number and date at http://appl.nasa.gov/businessunits/knowledge/programs/master_forums.html.

You may have also noticed that many of the Forum presentations also appear in narrative format in *ASK Magazine*, available online at www.appl.nasa.gov/ask. That means that this same knowledge, without the editorial comments found in feedback, is available on the APPL website to everyone, whether you attended the forum or not. Anyone can "steal" this knowledge sharing opportunity.

I wasn't able to attend the 8th forum this past year, but I was able to take part in the knowledge sharing. To those of you who wrote the excellent feedback, I thank you. I'm looking forward to seeing you in San Francisco! •

Lessons

- When you are open to it, Knowledge Sharing becomes a tool for life, not a one-day workshop. Never underestimate the lessons you could learn from "communities of practice" composed of your experienced peers.
- Reinventing the wheel isn't admirable if it's unnecessary. Don't be afraid to steal, imitate, revise, and reuse the lessons and best practices of others.

Question

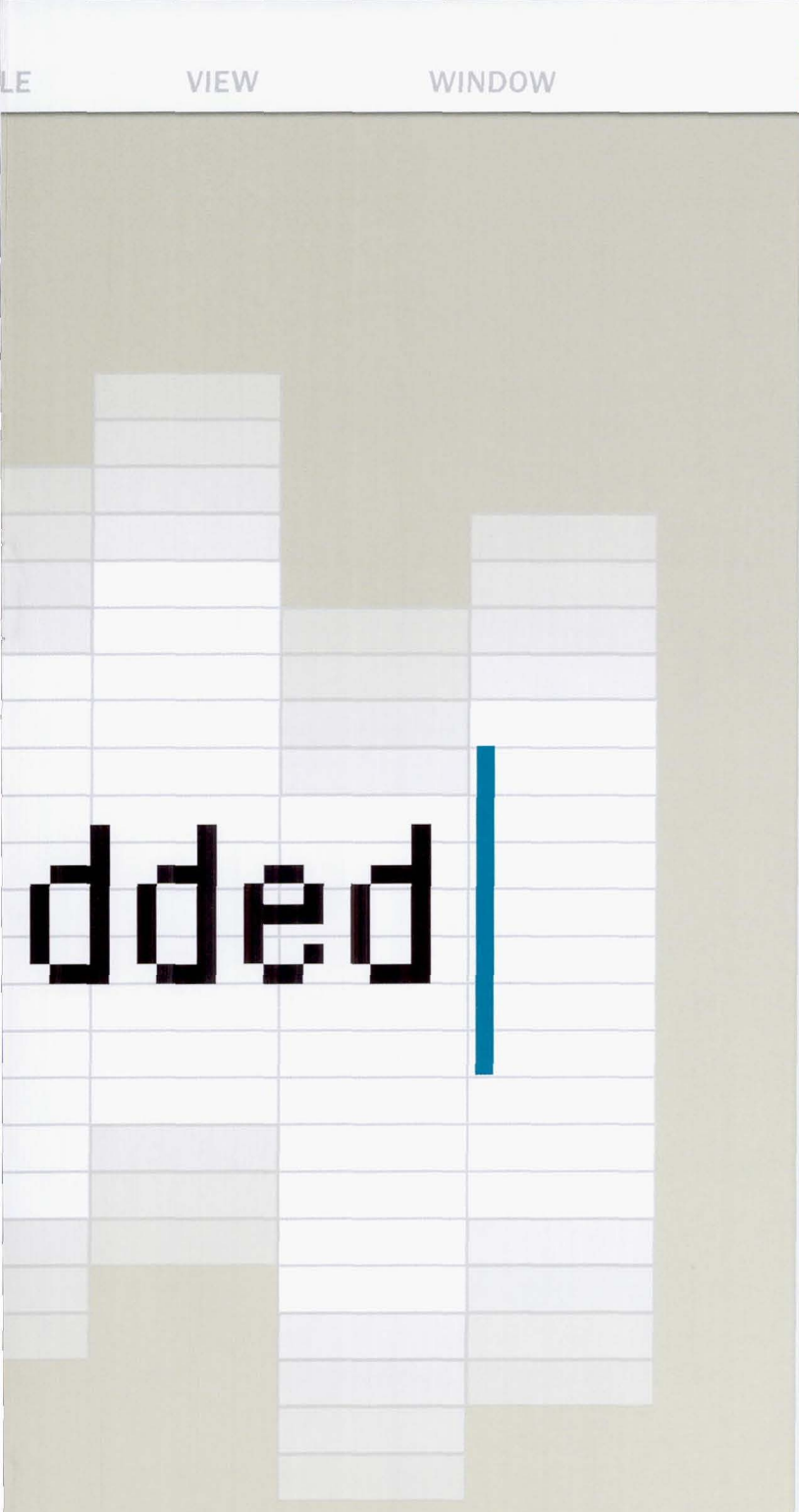
For learning to occur, errors, mistakes, and occasional failures must be accepted. How does one create the conditions that overcome human nature: the fact the "everyone wants to learn, but nobody wants to be wrong?"



After over 28 years of program management experience, **LARRY GOSHORN** retired in 2003 from ITT's Aerospace/Communications Division as the Director of Space Programs. During his career, he successfully managed a variety of NASA payload projects, and he now works as a program management consultant in the Aerospace Industry. Goshorn previously published an article in *ASK* 18.

Earned Value-A

by Michael Jansen





Earned value management (EVM)...either you swear by it, or swear at it. Either way, there's no getting around the fact that EVM can be one of the most efficient and insightful methods of synthesizing cost, schedule, and technical status information into a single set of program health metrics. Is there a way of implementing EVM that allows a program to reap its early warning benefits while avoiding the pitfalls that make it infamous to its detractors? That's the question recently faced by the International Space Station (ISS) program...

In 2002, I joined the Station program's Assessments and Cost Estimation Office (ACEO), an organization established to perform the kind of early warning, "Where's-my-program-headed?" assessments that few program managers have the time or staff to do thoroughly.

By the time I joined the team, the ACEO had already established several unique tools with which to develop meaningful summaries and "What's-the-data-really-telling-you?" assessments for the ISS Program Manager. But one key program control tool remained missing: earned vlue based performance measurement. Leading the development and implementation of a program-wide EVM system became one of my early tasks, to no small extent because I volunteered that I understood EVM and believed in its utility.

But you've got to use the data

Mid-program EVM implementations, I soon discovered, are widely held by industry to be difficult endeavors at best. Although the ISS program was receiving monthly EVM data from its major contractors, nobody was tying them together to form a consolidated performance message. And even if someone had, only about half of the program's work would have been covered under this type of performance measurement.

Few seemed to be using the contractor EVM data we were getting. Most managers were collecting it because it was required, not because they saw the value inherent in EVM reporting. The common feeling was that EVM was expensive, faddish, a royal pain in the posterior, and definitely not worth the effort. This feeling was expressed even more strongly by managers of work content not already encompassed by EVM reporting: "I'm getting all

the data I need through planned vs. actual costs, plus the technical updates I receive monthly from my leads...why do I need earned value?"

That was only the beginning of the challenge. ISS was already squarely in operations, even as the last of the development effort was wrapping up. Some astute managers started asking the very good question of how meaningful EVM would be when applied to what they considered to be essentially level-of-effort work. Literature and Internet searches unearthed no examples of implementation of EVM on programs in the operations phase; nobody's corporate memory could recollect such an instance either. And it didn't help that what some veterans could remember was that a prior implementation of across-the-program EVM had been abandoned largely because the associated overhead was perceived to outweigh the benefits.



▶ The overall program status was very close to the management team's "gut feel."

Then there was the issue of timeframe. All knowledgeable sources indicated that EVM implementation was often a multi-year endeavor. Once initiated, EVM systems were said to take at least four to six months to "settle out" and produce meaningful data. My team's marching orders were to have a tested EVM system in place in time for the start of the next fiscal year (which at that time was less than five months away) and to have results capable of withstanding outside scrutiny after the first month of baseline operation.

Drumming up support

A crucial first step was to develop an implementation plan and gain the Program Manager's support. We outlined an aggressive schedule that supported conducting three dry runs of the new system. The Program Manager agreed to our plan, as well as to our request to present it to his control account managers at his next senior staff meeting. Having the Program Manager openly support our efforts in that forum was worth far more than any amount of lobbying we might have attempted to do. We had a sanctioned plan in front of everyone. Now we had to make it happen.

Dealing with PMS

Our philosophy of implementing an EVM system which maximized return on investment included minimizing the impact on managers' existing workloads. Our new Performance Measurement System (PMS—yes, we've heard all the jokes) was to be based on earned value concepts rather than to be a formal, certified EVM system. The idea was to use existing schedules, metrics, etc., rather than to reinvent the wheel. Considering that our program was largely in the operations phase, we also didn't expect to cover the high percentage of total work content under discrete earned value performance metrics that traditional EVM systems do.

We concentrated on measuring performance for those tasks that, because of their risk, high cost, or visibility, could cause potential problems for the Program Manager. In this approach, we identified and closely watched those items that could become "gotchas." Thus our PMS became closely aligned with the program's risk management system.

Another facet of making our PMS palatable to managers involved relieving them from as much of the implementation effort as possible. For example, our team shouldered the up-front work of developing a PMS process tool that would minimize the effort required for control account managers to make monthly EVM inputs and retrieve processed data for analysis. Our team drafted top-level, resource-loaded schedules for those control accounts that didn't already use one

in routine status reporting. We reiterated our "low-impact implementation" message as we presented our pre-developed schedules and formats to managers and their support folks, then worked with them to answer questions and revise the schedules.

Within ten weeks of the inaugural senior staff meeting, we had our process defined, and the first version of the PMS tool developed and validated. We also had top-level, resource-loaded schedules for all of our new control accounts, covering the three-month dry run period laid out in our PMS implementation plan. Similar schedules, covering upcoming fiscal year 2003, were in place. An innovative, more understandable way of looking at the EVM data—adapted from a DoD format—was incorporated into our tool and ready for debut with the ISS senior management. We developed methods of projecting end-of-fiscal year expenditures, as well as the split between unencumbered under-run and content-laden roll-through—taking into account such unorthodox factors as being in the operations phase. Convergence metrics were devised to track the system's "settling out" and to project when the EVM data would be mature enough to be considered meaningful for management decision making.

But will the process work?

Starting with the first dry run, we made monthly briefings of PMS results to the Program Manager and his senior staff. The initial results were interesting: Any given control account's data could be all over the map, but in aggregate the PMS estimate of overall program status was very close to the management team's "gut feel." The second month's dry run results showed more of the same behavior, and underscored what EVM experts had predicted: The data should be expected to vary widely from one month to the next until the system "settled out." By the third dry-run, however, the system already showed signs of stabilizing, particularly the ISS-level aggregate data. The Program Manager and his team were pleased with the initial results, as well as with our tool's data processing and presentation; the go-ahead was given to proceed with a baseline PMS for the new fiscal year.

Success...!

The initial baseline run, completed within six months of approval of our implementation plan, went as smoothly as anyone could have hoped for. The new resource-loaded schedules were completed just in time; the last-minute process and tool tweaks came together the same way. The financial and earned value data—once loaded into our PMS tool—resulted in a very believable ISS status that was in line with the senior managers' understanding of the program's technical, cost, and schedule situation.

Perhaps most importantly, the EVM data sparked questions that forced managers to look a bit deeper into what was going on in their respective areas of responsibility. Those healthy discussions alone made all the previous months' efforts worthwhile.

All of this was accomplished with the part-time efforts of a half-dozen people on our team, plus a couple of people from each of the ten new control accounts we created—and is being maintained with far less overhead than is commonly attributed to EVM systems. Our home-grown Excel®-based PMS tool, besides being "no-cost" compared with commercially available software, enabled us to tailor every thing at will to meet our analysis needs. Our PMS, including the unorthodox projection methods we developed, went on to predict fiscal year closing statistics to within a half percent a mere three months into baseline operations. EVM has become a valuable tool in our assessment suite indeed.

We swear by it. •

Lessons

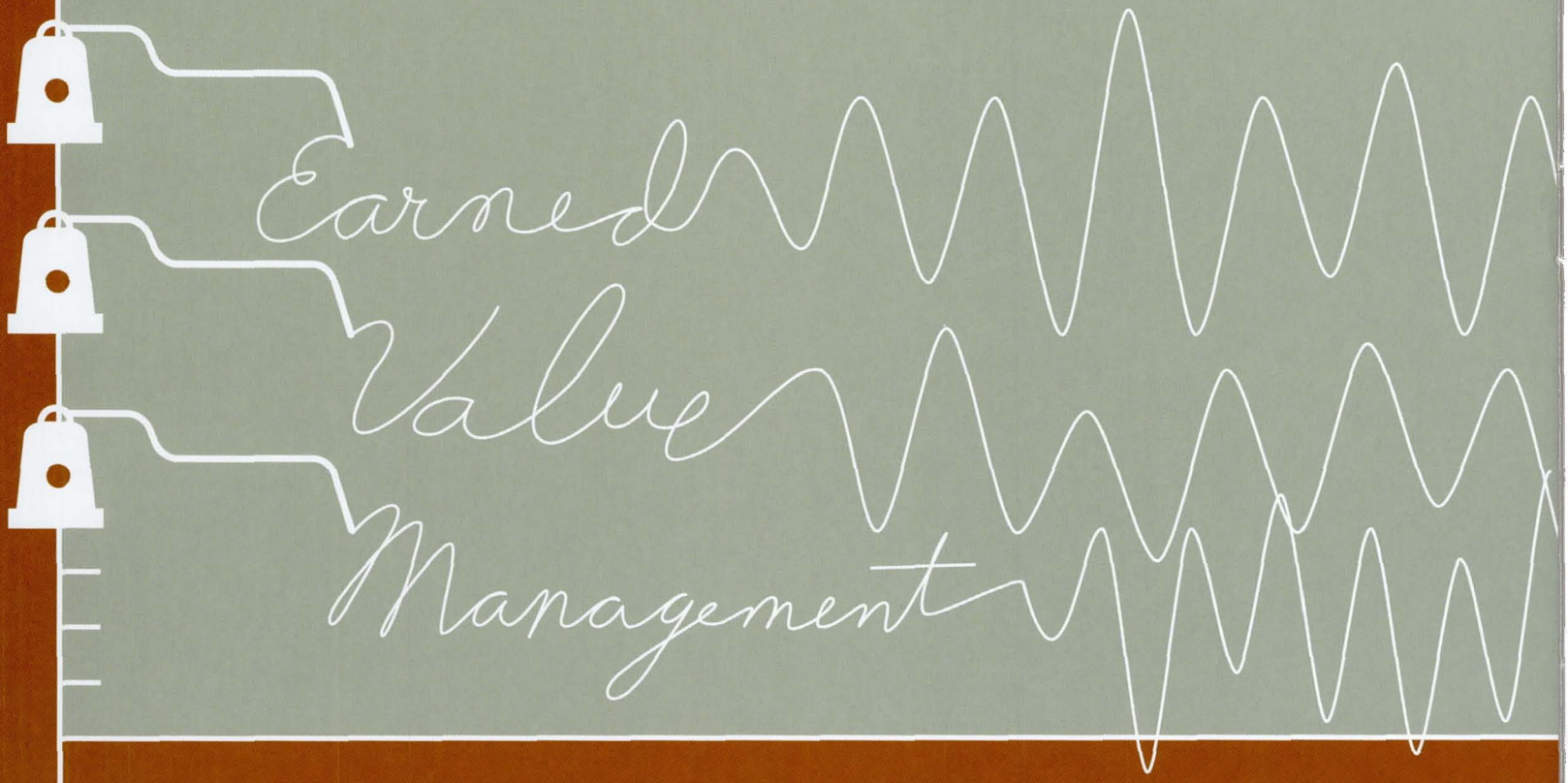
- Rather than forcing a situation to conform to a solution that doesn't fit, flexibility and a willingness to try new things are necessary to tailor known techniques to the specific needs of a project.
- Overcoming the project team's resistance to change can be facilitated by minimizing the direct burden that results from the implementation of that change.

Question

Why is a methodology developed more than a generation ago still unpopular in many well-developed organizations, and why does it still require a dedicated introduction effort?



MICHAEL JANSEN leads the Assessments branch within the Program Planning & Control Office of the International Space Station (ISS) Program at the Johnson Space Center (JSC). He is active in NASA training, knowledge sharing, and community outreach activities.



PUTTING EVM TO THE TEST

TALK TO ANY PROJECT MANAGER IN INDUSTRY OR GOVERNMENT AND YOU'LL FIND THAT TWO OF THE MOST COMMON COMPLAINTS ARE COST AND SCHEDULE OVERRUNS.

BY JERALD KERBY AND STACY COUNTS

In many instances there is no forewarning; schedules slip, costs soar, and the project manager is faced with the near impossible task of explaining why each impact occurred. With contractors performing the majority of the work, the management job can become even more obscure. The simple lack of proximity to the contractor can limit effective communication. Add to that a mixture of cultural differences and a desire for the contractor to portray the most optimistic view of their performance, and you create an even more difficult task for the project manager.

This was the scenario when the Habitat Holding Rack (HHR) manager at Marshall Space Flight Center (MSFC), Stacy Counts, was introduced to the overall concept of Earned Value Management (EVM). Faced with increased costs (which eventually resulted in decreased scope of the project), continued schedule slides, and several technical anomalies, she was looking for a way to gain a better handle on the project performance.

As a component of the Space Station Biological Research Program (SSBRP), the HHR project is an integral piece of the Program content. The HHR is the first rack hardware to be delivered for the Program and has therefore been the first rack to move through the trials of test and verification—documenting anomalies and technical difficulties that will benefit the other SSBRP rack projects. For these reasons, the HHR maintained high visibility throughout the manufacturing and assembly process, continuing through test and verification activities. Needless to say, the higher visibility emphasized the need for improved performance on this project. And to improve project performance, Stacy first had to figure out how to measure the cost, schedule and technical objectives effectively.

Enter the concepts of Earned Value Management

As the principle center for EVM, MSFC was fortunate to have a group of experts—Jerald Kerby among them—whose knowledge of EVM was substantial, and who were willing to work with Stacy to apply the principles of EVM to her project. The overall goal was first to understand performance and better deal with the current overrun environment.

Second, EVM would be implemented to improve the ways of managing cost and schedule concerns, and to plan ahead for future impacts that might result from the current situation. The process helps to measure performance in cost, schedule, and technical areas, and it would also help Stacy better identify her project risks. By measuring performance effectively and predicting a good percentage of issues/concerns upfront, mitigation plans could be put into place to help reduce or eliminate big impacts to the project.

The first step: determining the status of the project

Without an understanding of the current project status, there is no baseline from which to measure future evaluations. For a standard project that is in the early

WHAT IS EARNED VALUE MANAGEMENT (EVM)?

EVM is a process that has been used for years by government and industry projects, predominantly by the Department of Defense (DOD), to measure performance and health of the project. Government contractors use the process either as directed within the contract itself (currently NASA Policy Directive (NPD) 9501.3 but soon to be in NPR 7120.5C), or simply by choice. Unfortunately many projects never fully realize the potential of EVM and what it can do to help managers better understand the overall health of the project. EVM is not just a report! EVM is a tool that integrates the cost, schedule and technical requirements of a project. EVM also links these areas to the project's risk management process. EVM requires discipline in all aspects of the project; it requires that the organization performing the tasks plan the work and then work to that plan.

Obviously, some problems will occur that could not be predicted and therefore will not be a part of the initial plan; however, good initial planning followed by continual analysis and re-planning allows a manager to better mitigate issues and concerns that crop up. The use of EVM also helps the project manager in determining the current project status by answering questions such as: Are we on schedule? Are we on cost? Do the costs reflect the true accomplishments? What are our variances? EVM identifies trends that help a manager better predict where the project or a particular element is headed. EVM provides a method and data to establish a realistic Estimate At Completion (EAC) for the project. In essence, EVM gives personnel more reliable information to make better management decisions.

"Up until about three or four years ago, the people that had Earned Value Management on their contract would get a big, thick report and use it for a door stop. They just didn't use the information."

—JERALD KERBY

stages of design development, an Integrated Baseline Review (IBR) is held. Much like a Design Review, the IBR is a review used to understand the project's performance measurement baseline (PMB) and project objectives. The IBR also enables project personnel to understand the PMB in three areas: cost, schedule and technical performance. Based on this review, the project identifies and documents the risks associated with elements of the project so that mitigation plans can be developed for each.

But since the HHR Project was only two years from a completion date when Stacy came on board and recognized the need to use EVM, Jerald helped her to conduct a "mini-IBR," or a benchmark review. This helped them to assess the health of the project and to establish a more realistic PMB. The review was scheduled in such a way that it would not interfere with the contractor's regularly scheduled tasks.

The entire process went smoothly, and every effort was made to alleviate intrusions that would cause cost or schedule impacts in performing this review. Once the review was completed, the entire team had a much better vision of the remaining tasks, and individuals came away with a clearer picture of their piece in the overall project flow.

With contractors and government personnel working from the same baseline, the last step in the review was to come to documented agreement on remaining project objectives. The review resulted in a better-informed project team, and a group of people that learned to work together rather than having a "government versus contractor" mentality.

The second step: working with the schedule

In reviewing the PMB, schedule experts performed a review of the HHR schedules to ensure that good network logic was in place and that all task dependencies in the schedule were linked accordingly. Personnel from the Project Analysis Office at MSFC worked with Stacy and her team to determine whether the time and resources associated with each task were appropriate. Once the schedules were reviewed, specific issues dealing with missing network logic and unlinked tasks were discussed, and actions were taken to update the schedules as needed.

During the schedule revisions the HHR team first realized the importance, and impact, of EVM. Although contractor personnel had established critical paths for every piece of the project schedule, an overall, high-level schedule did not exist to tie them together. Once a good schedule was developed for the overall project—linking all the major pieces of the project together—HHR personnel could better predict a date for completion of the work, as well as to develop a true critical path for the project. This schedule update also allowed for schedule changes to be added. These changes helped to identify clear critical paths for the project, and also helped the team to pinpoint an end-date which was tied to the impacts of those changes.

The third step: applying the review concepts

Good schedules certainly help to better plan a project in detail, but the implementation of that schedule is key to any project success. Once the initial review was complete—covering all functional areas of the

"When you start using EVM, I think it is very important to sit down with your team to help them understand that this is not an antagonistic activity. The contractors need to know that you're not trying to beat them up, but to establish a true story of the project. They may have a more optimistic view of what the project looks like at the end of the year, and I'm bringing in a different, more realistic perspective."

—STACY COUNTS

> "EVM gave me something to walk into a meeting with my contractors and speak to. I found that they would come in with their cost data and tend to put their best foot forward. I now have something substantial to back me up when I say, 'Your past performance says you're going to overrun—not only by what you're telling me, but probably by more.'"
>
> —STACY COUNTS

project—the HHR team began to use EVM to regularly manage the project.

The practice of EVM forced good planning by measuring work progress and providing the cost and schedule metrics to track project performance against the baseline plan. Using initial data, as well as each consecutive month's data as it was delivered by the contractor, the HHR manager could determine both cost and schedule variances and identify developing trends across the project's tasks.

The fourth step: continuous review of data

The primary data was submitted by the contractor via disk, loaded into a data analysis software tool (wInsight), and a 5-page summary report was printed for review with the contractor each month. This report was reviewed alongside the standard Cost Performance Report (CPR) that the contractor submits monthly. With constant access to EVM data, both the contractor and Stacy's team were able to see a realistic picture of where the project had been, where it was headed, and how fast it was likely to get there.

It works if you work it

EVM is a management process that has been embraced by project managers around the globe with good success. It allowed Stacy to define a PMB for the project that was more realistic than the previous baseline. It also provided her with the necessary data to track performance and to ably discuss project impacts with higher-level management. This was the data the project team needed to back up that "gut" feeling that comes from years of project experience—experience that says you will almost always have schedule slips and cost overruns.

While EVM doesn't make the problems go away, when implemented properly it can help to identify problems before they reach their full potential. Today, project success is no longer an unattainable goal. By using EVM data to guide a project on a monthly basis, objectives can be more easily reached. With good tools, solid upfront planning, and effective implementation of these tools, project managers can be better informed to make management decisions during the entire life cycle of their project. •

Lessons

- When all members of the project team—whether government or contractor—understand the objectives and work together from the same baseline, you are more likely to reach project success.
- The ability to track performance and cost and schedule variances gives the Project Manager the information they need for a preemptive strike to slips and overruns. That is, they don't have to operate on their "gut feeling" alone; they have the data as soon as a problem begins.

Question

How can you change perceptions by introducing this tool to contractors as a benefit to the team, rather than a way of checking up on their performance?



JERALD KERBY is the EVM Focal Point for Marshall Space Flight Center, where he supports the implementation of EVM for the Center's projects.



STACY COUNTS manages the International Space Station's Biological Research Project (BRP) Habitat Holding Rack (HHR). She credits the EVM tools available through the MSFC Chief Financial Office with helping her to establish a realistic approach to project planning, and a solid method for assessing the quality of contractor financial data.



EARNING VALUE

BY GLENN RHODESIDE

IN 2002 AND EARLY 2003, KENNEDY SPACE CENTER CONDUCTED A PILOT IN WHICH EIGHT IN-HOUSE PROJECTS IMPLEMENTED EARNED VALUE MANAGEMENT (EVM). BUT LET'S JUST SAY WE WEREN'T WELCOMED WITH OPEN ARMS.

WE'D SAY, "WE'RE EVM. WE'RE HERE TO HELP." AND MANAGEMENT WOULD SAY, "WE'VE GOT ALL THE HELP WE NEED, THANK YOU VERY MUCH!" IT WAS LIKE THAT TOM PETTY SONG, "DON'T COME AROUND HERE NO MORE."

AGAINST RESISTANCE

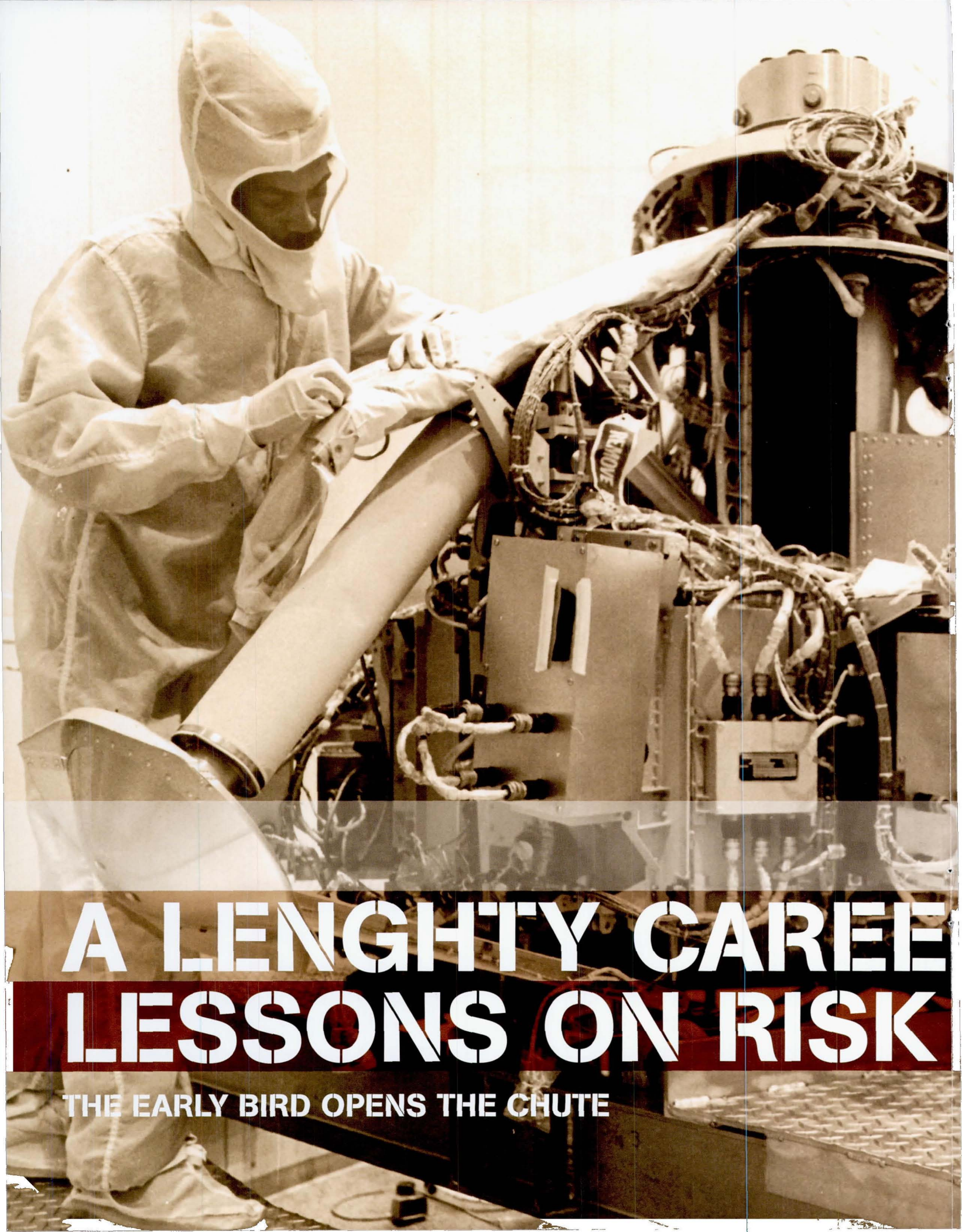
THE PROJECT MANAGERS WERE GIVEN A HALF-DAY OF EVM training. Although a portion of the project managers had some experience with EVM, the concept was completely new for some of them. The rest of that training day was spent helping them to start the base-lining process and answering any questions that they might have had. Slowly, we helped them to develop a baseline, and then conducted pseudo-Integrated Baseline Reviews (IBR) where they presented their Work Breakdown Structure (WBS), their integrated resource-loaded schedules, their risks, and their risk mitigation plans. The intent, as with any IBR, was to get to an agreement with the project management so that everyone understood the baseline, what the project's risks were, how they were going to collect the data, and how they were going to use EVM to manage their projects.

What we realized during the base-lining process and as the project personnel collected data and performed cost/schedule performance analysis was that half a day of training just isn't enough to learn how to use EVM. We recognized the need for at least two or three days to learn the basics. We also realized a few things about the culture and environment of project management in NASA, specifically in relation to implementing this type of change. We figured out that we had to anticipate some level of resistance within the organization, especially if they've never done this before. We had to be patient, work with them, and hold their hands a bit. It also didn't help that our financial systems did not collect actual costs in a manner useful for EVM. Lack of automated data collection meant manual manipulation of some data—an issue not present with most contractor financial systems.

Lastly, it didn't help the cultural resistance when we came in halfway through the projects. EVM may benefit a struggling project, but for our pilot, there was a price to pay to come in after the start. There were already systems in place on the projects and we came in and told them that they had to change everything and start using EVM. We realized that to be most effective, EVM has to be introduced at the very beginning of the project. •

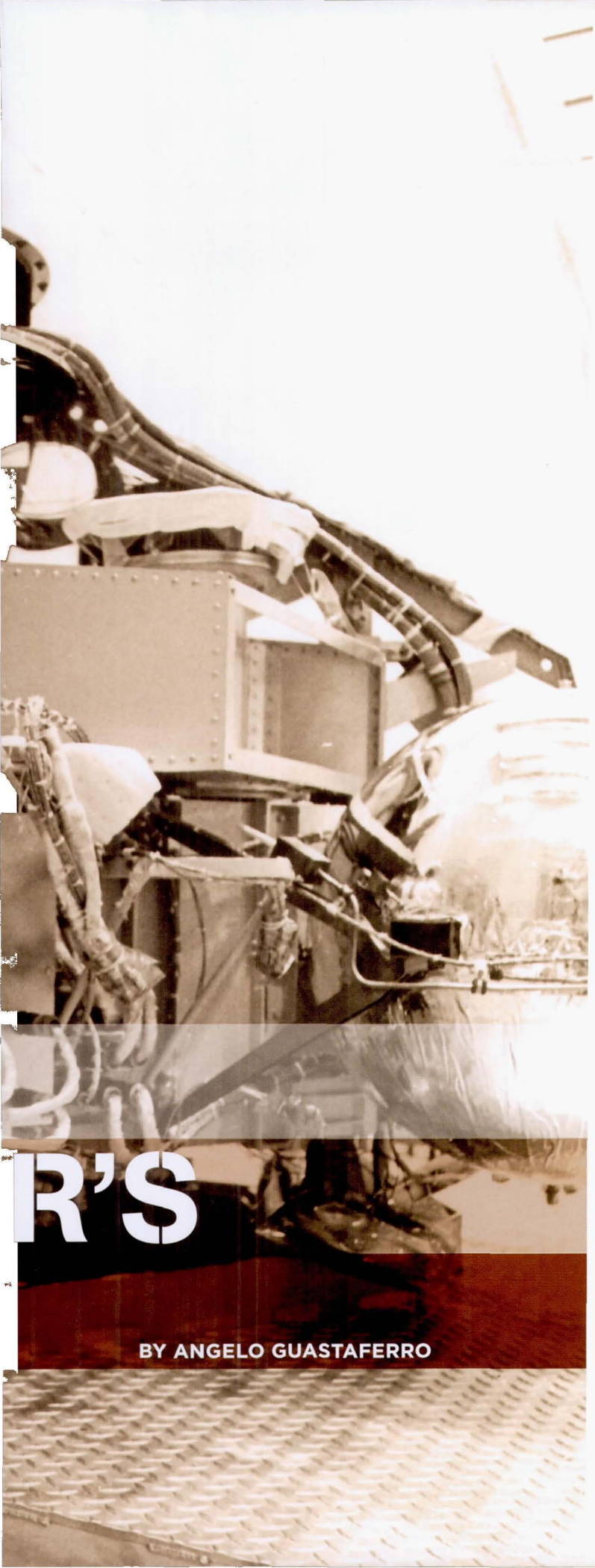


GLENN RHODESIDE performs systems engineering, risk management, cost estimating, operations analysis, and related analysis for varied programs and projects. For the past three years, he has been a member of NASA's EVM Focal Point Council to set and coordinate policy, as well as share best practices and lessons learned.



A LENGHTY CAREE
LESSONS ON RISK

THE EARLY BIRD OPENS THE CHUTE



R'S

BY ANGELO GUASTAFERRO



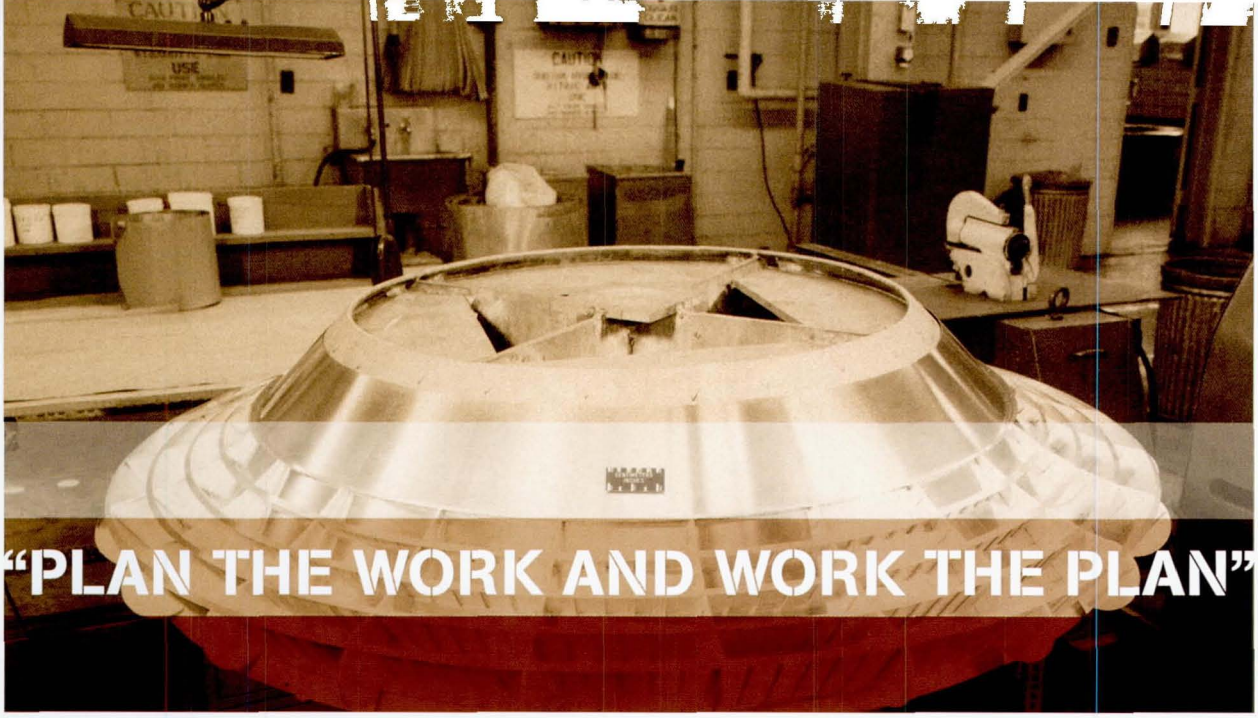
I HAVE BEEN INVOLVED WITH PROJECT MANAGEMENT FOR FIFTY YEARS. RATHER THAN FOCUSING ON ONE PARTICULAR STORY, I'D LIKE TO TELL YOU THE LARGER STORY OF MY CAREER. THOUGH MANY OF THE PROJECTS TOOK PLACE OVER THIRTY YEARS AGO, THEIR LESSONS ARE STILL RELEVANT TODAY.

I BECAME A PROJECT MANAGER AT AGE TWENTY-TWO AT Eglin Air Force Base. I managed the droning of the B47 to fly unmanned, and I had zero experience to take on that task. What I learned is the real way you acquire risk aversion: I was scared to death that I'd fail.

This developed a characteristic that I carried with me throughout my career. The strongest thing a project leader can feel, in terms of risk, is the risk of failing. So I took it upon myself to learn everything about the airplane and the guidance control system by searching out the best in the aerospace community. At that time, Lockheed was doing a modification of the aircraft. Boeing designed and built the aircraft, and Sperry was doing the guidance control system. I made sure that I spent hours and hours with each of them to understand exactly what I was responsible for.

SETTING THE PATTERN

The pattern that I established for my career was one of research and faith in the skills of other team members. Through the years as I worked on other projects, the philosophy I developed is that you can be very successful if you spend the time to organize yourself, find qualified people, and understand the objectives. Once you decide what you need to do, you can organize people around it. You can get the skills. That's the strongest way you can become risk averse—to be



"PLAN THE WORK AND WORK THE PLAN"

dependent on the strengths of others and bring them into the program as best you can.

When we worked on Viking, the first landing mission to Mars, it was done at Langley Research Center, which is really a technology center. Langley was selected because of its strong technology base, and the Jet Propulsion Laboratory (JPL) was busy with the Mariner and Voyager projects.

We ended up using this to our advantage. Not only did we concentrate on finding qualified people, but we found that by doing the project at a technological center, we were able to get people who were strong in the technical skills it took to do the re-entry, to solve aerodynamic problems, and to develop the parachute. So Langley turned out to be a technological advantage.

THE EARLY BIRD OPENS THE CHUTE

But the parachute reminds me of the different ways in which the first and second Mars Missions dealt with risk. They were both successful, but the roads getting there were different. In 1969 we did a full-landed simulated test at White Sands. We simulated the spacecraft in the necessary ways and developed the parachute very early. The reason we did that was to make sure that the parachute got sized properly, since the whole integration of the spacecraft was going to be built around the size of it.

The recent Rover Missions on Mars waited too long to do that test. They did it about nine months before they were supposed to launch and the parachute didn't fully deploy. So they had to go back and do a redesign of the parachute, but the whole spacecraft was designed and fixed. At that point there were many variables to look at and problems to solve, and the risks went up tremendously because of the limitations they had in changing the design.

So not only should you organize yourself and get qualified people, but you have to do things early. You've got to build enough reserve in your thinking so that you can minimize problems. The other thing is: If you have a threat of cancellation over your head, or your project might be moved to another center, or parts of it are being deleted—you allow for that, and you adjust. If you stop working because you're worried about changes to your program, you start adding risks to it.

THE GROUP EFFORT

Also, you have to be disciplined in carrying out very critical analysis. Don't move on without it. On Viking, we brought the science community in early for the 1975 launch. They attended every design review and participated very strongly. We wanted their fingerprint on everything that was done from an engineering viewpoint.

My mentor Jim Martin insisted that if this was going to be their opportunity for a scientific achievement, then they needed to participate in the program all along the way. Would you believe that 72 scientists moved to JPL from their various universities for one year during the Viking Mission just because he said that was where the action was? He said, "If you want to play on my program, that's the way it's going to be." You can't avoid risk over the telephone.

PLANNING FOR THE WORST-CASE SCENARIOS

During Viking, we also developed about 500 scenarios of all the things that could possibly go wrong during the development and flight. We adopted a very pessimistic view and used these scenarios to establish various plans for cost offsets, budget shifts, and solutions to technical problems.

We did have a problem that I'm not proud of, but it also taught me something about risk. We had money problems, and we were told that we weren't getting any more money. The cost was fixed, and the schedule was also fixed since it was a planetary launch.

Well, we had a risk problem related to a test. One of the problems with the fixed budget was that we weren't going to be able to perform the terminal-landing test. This was a very sophisticated full-systems test where we would drop the spacecraft through a Mars landing simulation. We had pitched the cost problem to headquarters, saying we needed $1.2 million dollars, and we were denied the money. So we were going to have to launch without the critical terminal-landing test—a very high-risk decision.

Jim Martin accepted it at the time. He said, "Ok, as long as you hold my hand, I'll jump into the pool with you." So we made the decision to go ahead with it. We ended up being successful, but there was a large amount of risk attached. If we had failed we would have lost $1 billion dollars (and this was in 1970) because we couldn't secure the $1.2 million for the necessary preliminary test. That just doesn't make sense. It wasn't a schedule problem; it was strictly a cost problem.

GIVE IT TO THEM STRAIGHT

This is where I really learned a big lesson. As a project leader, you've got to take the problem before management and tell them the risks that they are taking by withholding funds. You've got to be tough and hang in there. At this point, we were seven years into the project. Jim decided to swallow hard, pray a lot, and cross his fingers that the test worked. We had a happy ending, but under other circumstances, it could have been a disaster.

This is an example where management made the decision to take the risk against the security. I think that's the thing that has to change. We're in a high-risk business, and we have to approach it in a conservative way. But the Agency needs to realize that sometimes the failures make you learn and progress.

I'm not saying that you set out expecting to fail, but there is such a thing as so much risk-aversion that you don't do anything. You've got to maintain a healthy amount of it and move ahead. And these are just some of the strategies I learned over my fifty years that have helped me to do that. •

PEOPLE FIRST

There have been times when I've taken over a project in the middle, and also times when the project has been in the formative stages. In every case, I've gone off-site and started to look at—and fix—duplication. Everybody has to be in first grade again. I say, "Stand up and tell me what you think your job is." They do that. Then you start listening.

Sometimes I'd find out that two or three people were doing the same thing. So I started to fix it. I'd find out where the holes were, where there is somebody who is not doing anything. So you work it out so that everyone is clear about exactly what they are doing and what the goals are.

Then you have to empower people to build a high-performance team. This team has to be willing to communicate and tell you exactly where you are. You do this by dealing with the complete human circle: the social aspects, the commitments, the truthfulness, the relationships, the passion—all the things that we measure in people. Then you can take their technical skills and apply them in a way that really drives the system to success.

A process doesn't get the spacecraft built. A logo or a motto doesn't make it happen. It's people.



Lessons

- Sometimes pessimism can help to reduce risk. Planning for possible problems—and developing a cost and schedule-efficient way of dealing with them—can provide an important project "safety net."
- A small amount of funding is never worth the failure of a large-scale project. Project managers have to fight to get the resources they need to do things right—not cross their fingers and hope for the best.

Question

In a situation where mistakes and misjudgments can cost millions of dollars, how do you strike the right balance between healthy risk-aversion and playing it too safe?



ANGELO "GUS" GUASTAFERRO has had a lengthy career in Program and Project Management, both at NASA and with private industry. His previous story, "Bringing Up Baby," was printed in *ASK* 17.



A LEADER

NOT A HERO

I LEFT THE JOINT AIR-TO-SURFACE STANDOFF MISSION (JASSM) AS A SYSTEMS ENGINEER TO START A NEW PROGRAM CALLED THE SMALL DIAMETER BOMB (SDB). I THOUGHT THAT THIS WOULD BE A GOOD OPPORTUNITY TO MAKE THE TRANSITION INTO PROGRAM MANAGEMENT.

BY LYNDA RUTLEDGE

THIS LITTLE WEAPON, THOUGH, WAS NOT JUST REPRESENTATIVE of a transition in my career. It was a paradigm shift for the Air Force. Traditionally, we've held the American outlook of "bigger is better." Look at our cars, our houses. So this program was symbolic of a culture shift. It was important to make a switch to smaller weapons, because the Cold War was over, and we were going into smaller areas. Collateral damage became a big issue, and we were limited in space on the aircrafts.

BUT CAN SMALLER GET FUNDED?

Being naïve, I thought, "We're going to start up a program. Somebody must want this. They'll give me money, we'll lay out the strategies, and we'll get started." I was frustrated when it didn't go that way. Somebody told me that it takes patience to be a Program Manager. I thought, "Well, I'll work on that."

While I was working to obtain funding to develop an acquisition strategy and to build coalitions, I was also trying to make people understand what we were doing. The weapons side of the house doesn't get a lot of money thrown down to us compared to our aircrafts. So at first I had a very small team of only four people.

The four of us worked day in and day out coming up with acquisition strategies and working with our warfighter users to develop requirements. But every year we'd find out that we were just under the cut and that we wouldn't get funded. And every year I would think, "It's time for me to leave." But I kept going, kept trying to build it. After three years of trying to start this, I had laid out about 20 acquisition strategies in any flavor you wanted. I had all kinds of choices for anybody that came along.

THEN IT SNOWBALLED

It was Super Bowl weekend of 2000—not that I watch the Super Bowl, but my husband was watching it—and I was working on getting my numbers together. I had gotten a call that Friday afternoon saying that General Jumper, who at the time was the Commander of Air Combat Command, wanted to pursue development of this weapon. So they said, "We're going to fund it."

I was so excited. I went around briefing my strategy and got things going. But what happened was that when this program started, I was in my comfort zone. Then my span of control went haywire overnight. Over a period of two months, I went from managing four people to 30 people.

At this point, I had made every decision about the program along the way. It was my vision, my baby, my masterpiece. I knew everything about this system. And I liked it that way. I loved being able to make every decision and to tell everyone what they needed to do to make my vision a reality. When I went into the teams, everybody knew how I operated: I tell you what to do, and you go do it.

Then I was sitting around the table one day in a meeting trying to get our Request For Proposal (RFP) together. What I found is I had driven these people to expect me to make every decision. All of a sudden, I got overwhelmed. I had about 25 people around the table, and I'm saying, "We need to have these factors developed. I need you to write your section L, you to write your section M, you to write your instructions for the offer, and then bring it all back to me." They all looked at me and said, "How do you want me to do that?"

I thought, "I'm in over my head. There is no way that I'm going to be able to do every one of these people's jobs, or tell them exactly what to do, or check all of their work." I just left the meeting.

OVER A PERIOD OF TWO MONTHS, I WENT FROM MANAGING **FOUR PEOPLE TO 30 PEOPLE.**

RELEASING THE GRIP

There was a retired Colonel who worked for me as a support contractor. I used him as a sounding board a lot. I sat down at his desk and said, "Bill, I'm in trouble. All of these people expect me to make every single decision and tell them exactly how to do everything. I'm not going to have time to do it anymore." He said, "You've got to let go of this. You have no choice. Otherwise, you are not going to make it."

It was extremely hard for me, because I felt such ownership of the program. I felt like I was giving up my firstborn when I gave it to these people to try to implement. But I called everybody back in the next day. They were waiting for me to give them instructions on exactly how to write up their RFP. I said, "Here's the deal. I'm not going to think for you anymore. We've got to get on contract in six months." I said, "If you've never done it before, you're going to learn now. I'm not telling you how to do it. You had better figure it out. I'll be happy to help you, but I can't do it all."

I was very nervous though. Here I was not tracking everything day to day. I wasn't right on top of it writing it myself. But by the end of the source selection, surprisingly enough, things had changed. Some of the people that wouldn't go to the bathroom without asking permission were up at the front of the room, coming up with their own methodologies, leading the pack, and making decisions. All of a sudden, they had emerged as leaders.

A NEW UNDERSTANDING

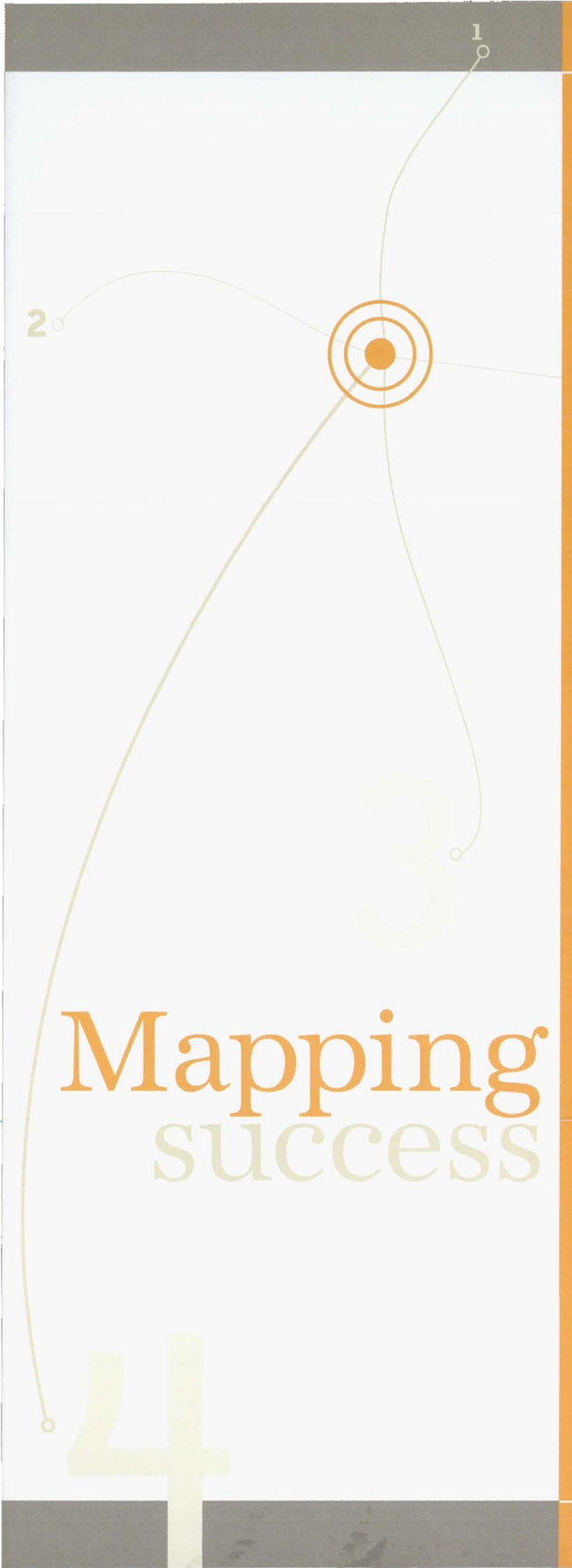
At that point, I was more proud of having let go than of doing it all myself. My focus had changed from the details, the implementation of developing every one of these criteria, and dealing with the contractors, to leading the people.

When I realized that I had to do that, things got easier. You would think that it was an obvious thing, but sometimes you have to learn the hard way. Heroes are people that can come in, take over, and do it all themselves. But when you lead people, you don't have to do it yourself. You're leading them to the vision.

I don't know that I necessarily ever would have gotten slapped in the face like I did had I just been on a normal program. After having gone from four people to 30 people in a two-month time frame—and having them staring me in the face, wanting to know everything to do—the light came on. No matter how good you are, this isn't a one-man show. There are no heroes in this. •



LYNDA RUTLEDGE was an Air Force systems engineer on the Joint Air-to-Surface Standoff Missile (JASSM) during the source selection phase. After leaving JASSM, she managed the concept exploration and planning of the program that is now the Small Diameter Bomb (SDB). She is currently Deputy Director in the Precision Strike System Program Office within the Armament Product Group at Eglin Air Force Base, Florida.



Mapping success

In a meeting facilitated by Goddard Space Flight Center's Knowledge Management Architect, Dr. Ed Rogers, **Root Learning Inc.** teamed up with members of the **Academy of Program and Project Leadership's** (APPL) Knowledge Sharing team, Denise Lee and Therese Cooper. In a brainstorming session with Root Learning's artists, together they worked to create an accurate illustration demonstrating the APPL vision. In its advanced stages, the drawing was sent to APPL Director Dr. Ed Hoffman and Deputy Director Tony Maturo for further suggestions. A few iterations later, APPL's successful collaboration with Root Learning produced the final version of this customized **"Learning Map."**

ROOT LEARNING, A LEARNING CONSULTING ORGANIZATION with a background in strategic planning, recognizes the knowledge gap that frequently exists between a leadership team and the rest of an organization. Team members supposedly working toward the same goal don't always have the same vision of where the organization is headed—and they may not understand how the piece they are accountable for fits into the big picture.

To address these complex problems within an organization, Root Learning utilizes the age-old tools of sarcasm, metaphor and graphics (much in the same way that *ASK* uses a traditional storytelling format.) The company is best known for creating "Learning Maps" like this one: humorous drawings based on the inner workings of an organization. Their purpose is to put complex topics on the table, to stimulate discussion, and to ultimately give team members a common vision of where the organization is going and what role they personally play in getting there.

APPL knows how effective it is to incorporate new and engaging techniques into its knowledge sharing programs. By collaborating with Root Learning, we were able to expand the knowledge of the organization and add one more of these techniques to our repertoire.

Academy of Program and Project Leadership

Career Development
Performance Enhancement
Knowledge sharing
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To learn more about Knowledge Sharing and other APPL services, find contact information at **www.appl.nasa.gov**.

Sarcasm, metaphor and graphics.



Root Learning Inc., is best known for creating **"Learning Maps"** like this one: humorous drawings based on the inner workings of an organization. Their purpose is to put complex topics on the table, to stimulate discussion, and to ultimately give team members a common vision of where the organization is going and what role they personally play in getting there.

Keeping Promises

BY GREGORY HOWELL

THE PROJECT, A COMPLEX HEALTHCARE FACILITY, WAS IN TROUBLE. THE MONEY AND TIME WERE GONE, BUT THERE WAS PLENTY OF DISTRUST AND MIS-COORDINATION.

SCHEDULING WORK SEEMED IMPOSSIBLE; THE DESIGN WAS filled with conflicts, and it kept changing. Supervisors were torn between finding work ready for today and trying to solve problems for tomorrow. It wasn't much fun, and the client was very unhappy. There was so much to do—and so little time—that it was hard to know where to start.

Design issues dominated the weekly planning meeting, so I went there to listen and learn. After new issues were identified and discussed, the meeting turned to review the status of unanswered RFIs. These Requests For Information typically originate in the contractor organization and are used to define, manage, and track solutions.

> COMMITMENTS ARE BETWEEN PEOPLE, NOT SCHEDULES.

Going down the list, Carl, the contractor's project manager, spoke to Dan the architect. "Dan, we need to resolve RFI 173." Dan shook his head in agreement, and they moved on to RFI 204. I wasn't at all sure what had happened or how to interpret this brief interchange.

After the meeting, I caught up with Carl and asked if Dan had promised to solve the problem. Carl was convinced that he had. I was not so sure, so we caught up with Dan and I asked, "Did you promise Carl to answer 173?" Dan was surprised and confused. "How could I?" he said. "I agree we need to get it resolved, but Carl owes me some vendor data before we can decide." Carl was taken aback; he had forgotten his promise to Dan. But after a quick discussion, both were back on track.

Walking away, I asked Carl why he had framed his request, "Dan, we need to resolve RFI 173." He said this was a nicer, more team-friendly way of talking. He claimed, "It puts us in the problem together." Carl and I are pretty good friends, so I took him straight on. "Teamwork isn't about being soft and unclear," I told him. "It requires making clear requests and securing reliable promises. Don't be a wimp—ask for what you want. And don't be a flake—do what you say you are going to do."

Coordinating work in projects and keeping projects under control is a matter of people making and keeping the commitments that release work to others in the right sequence. A project can be understood as a network of commitments that links the work of the specialists to the promise of the project and coordinates their action. *Carl makes a request to Dan...Dan asks for vendor data...Carl asks his assistant...somewhere a request is mistaken for an opinion, or the nod of the head is interpreted as a promise.* Planning systems can provide the structure and circumstance for planning conversations, but systems don't make work happen. People make work happen by making requests and keeping promises to one another.

DON'T BE A WIMP—ASK FOR WHAT YOU WANT.

There are ways to tell when you are making a reliable promise. Ask yourself if you can say one or more of the following:

1. I am competent enough to perform, or I have access to competence.
2. I estimated the amount of time (hands-on) required for this work.
3. I have the capacity available to do the work and have allocated it to the task.
4. I am not having a private unspoken conversation in conflict with my promise.
5. I will be responsible; I'll clean up the mess if I can't deliver.

Commitments are between people, not schedules. Project management as practiced today creates a "commitment-free zone," because it assumes that people will commit to centrally managed schedules without providing a mechanism to ensure their work can be done. So they give it their best, but something always seems to come up... "I tried, but you know how it is."

This form of project management does not provide a mechanism to ensure that what should be done, can in fact be done at the required moment. Too often, promises made in coordination meetings are conditional and unreliable. It has been my experience that at times trust can be low and hard to build in this environment. The absence of reliable promises explains why on well-run projects, people are often only completing 30–50 percent of the deliverables they'd promised for the week.

We all know what a promise is; we have plenty of experience making them and receiving them from others. So what's the problem? The sad fact is that the project environment—like many other work environments—is often so filled with systemic dishonesty, that we don't expect promises that are reliable. Project managers excel when they manage their projects as networks of commitments and help their people learn to elicit and make reliable promises. •



GREGORY A. HOWELL is co-founder and managing director of the Lean Construction Institute (LCI), a non-profit organization devoted to production management research in design and construction. Howell brings 35 years of construction industry project management, consulting, and university-level teaching experience to LCI.





DOCUMENTATION: NO SUBSTITUTE FOR COMMUNICATION

IN THE 25 YEARS THAT I'VE WORKED FOR GENERAL CONTRACTORS, OWNERS, AND ENGINEERING FIRMS, I'VE RECOGNIZED THE REQUEST FOR INFORMATION (RFI) PROCESS AS A HUGE SOURCE OF WASTED EFFORT AND NEEDLESS CONFRONTATION

BY JOHN STRICKLAND



So what is an RFI? It was one of the first things I learned about back when I started my project management career with my first large construction firm. I learned how to use these forms as a convenient and effective means of documenting the many legitimate clarifications needed on a major project. However, like most other young engineers, I also learned to use the RFI as a weapon in the ongoing battle between owners, or their designer and the construction contractors. Recently, our project team has done a few simple things to greatly reduce the waste and frustration that comes from this type of battle.

WHAT'S THE PROBLEM?

The RFI form can be a great tool if used properly, and I certainly don't recommend that they be eliminated entirely. The RFI form was created to document the many clarifications that are commonly required on projects. Typically, the contractor uses the top half of the form to clarify—or request permission to vary from—the contract documents. The bottom half of the form is used to record the answer. But this seemingly simple process is plagued by a number of problems.

From the contractor's perspective, RFIs are needed to secure information that should have been in the contract documents in the first place. The missing information keeps their crews from working effectively, and it makes hitting already demanding cost and schedule targets even more difficult. Owners, or their design firms, often view the RFI as a means of harassment. Both sides of the issue have legitimate complaints, and both sides cause most of their own pain.

Considering that year after year these problems appear on countless projects across the country, the total wasted effort involved is beyond comprehension. To make matters worse, many of the problems (and many of the RFIs) are completely unnecessary and represent waste in its purest form.

WHAT WENT WRONG?

It is easy to understand how the RFI was transformed from a convenient means of documentation into a weapon of project administration. Just start with the owner/designer side of the contract: tough-minded contract administrators or field inspectors would require contractors to remove and replace work that didn't match the contract documents—even if there was no functional reason to require the re-work. Contractors quickly learned to document even the slightest variation. But they also learned to write as many RFIs as possible in order to substantiate future claims. I recall a general contractor's manager explicitly instructing his staff to maximize the number of RFIs in order to establish that the design was flawed. And I'm sure experienced project managers can cite many other examples of wasted effort.

LOOKING FOR ANSWERS

We have learned that life on the project does not need to be as difficult as we make it. And there are some ways that I've managed to avoid these difficulties by focusing on communications skills and creating a culture of collaboration.

I managed to do this on one of my recent projects, a state-of-the-art facility constructed in the Pacific Northwest for one of the world's leading technology companies. Our scope was to install and connect hundreds of highly sophisticated machines in the shortest feasible amount of time. Contractors worked on very competitive fixed-price agreements and employed up to 1,000 craft employees at the peak of construction. Although hundreds of RFIs were generated, there were remarkably few complaints (if any at all) about RFI turn-around time, which averaged about three days.

OPEN YOUR MOUTH

The key to our good experience was recognizing the difference between documentation and communication. RFI forms are great for documentation, but they are no substitute for conversations. Our simple rule was that nobody should receive an unexpected RFI. The first step in our RFI process was to discuss the issue with



the construction coordinator in charge of the work. Many of the potential RFIs were answered before they were ever written, and no effort was wasted getting them through the system. The RFIs that were necessary could be answered very quickly, because it simply documented an agreement that had already been made.

REDUCING WASTE BY REDUCING NUMBERS

Several other techniques were used to reduce the need for RFIs, including thorough pre-construction job walks and design reviews to make sure that everybody understood the scope. We made sure that the construction management and design teams had good access to one another and provided many different forums for communication. When RFIs were necessary, they were electronically routed and tracked. We learned that an electronic RFI system can be a good tool, but will certainly not eliminate all of the friction in the RFI system. It's easy to imagine the computer-based RFI tracking programs as simply more powerful weapons in the battle.

THESE OPPORTUNITIES STEM FROM ESTABLISHING A COLLABORATIVE CULTURE, EVEN ON PROJECTS WITH RIGOROUS CONTRACTUAL REQUIREMENTS.

AND EVERYBODY'S HAPPY

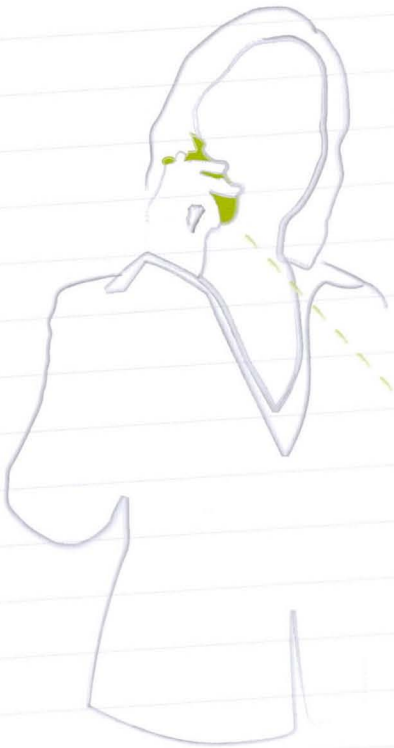
Contractors were happy, because they got their answers quickly. The designers were happy, because they got far fewer poorly worded RFIs that were unnecessary in the first place. The owner was happy, because there were essentially no change orders due to the RFI process to cause delays, disruption, or field coordination issues. The entire project benefited from the effort to develop a collaborative culture, and we set new benchmarks for safety and schedule performance as well.

The real lesson I took from this experience was what an amazing effect good communication can have on teamwork and project performance. Much of the conflict and confrontation that burdens the project team is largely unnecessary. There are countless other opportunities on our projects—from contracts to technical submittals—for improving project performance, as well as the quality of life for project team members. These opportunities stem from establishing a collaborative culture, even on projects with rigorous contractual requirements. One way I've found to start effecting change is to take a look at RFI processes, as well as other processes where communication is the key. •



JOHN STRICKLAND has led numerous major design/build and construction management projects within the microelectronics industry. He has developed a strong track record for completing projects ahead of schedule and under budget, and has helped pioneer numerous strategies that have dramatically improved "time to money" for clients. He has expertise in all phases of construction operations—including safety management, project controls, contract management and field operations—as well as the application of "Total Quality Management" and "Lean Manufacturing" techniques to complex construction projects.

"THE FACILITATOR SHOULD CONSTANTLY CHECK THAT EVERYBODY IS ON THE RIGHT PAGE."





MANAGING MEETINGS... REMOTELY

In 2000, I transferred from a department of predominantly manufacturing people to one in which most people had an IT background. For my manufacturing colleagues, "meetings" were always face-to-face activities.

By Hugh Woodward



But the IT people, many of whom worked from home, made no such presupposition. And so even when I issued a meeting notice, with the location described in bold, somebody would inevitably remind me to "publish the call-in numbers." Faced with conducting meetings of one, or learning to conduct effective remote meetings, I chose the latter.

I experienced more than my fair share of failures initially. But each failure prompted me to adjust my approach. I soon realized that the practices that make remote meetings successful are exactly those that make face-to-face meetings successful. But habits that result in poor face-to-face meetings are exacerbated in a remote environment.

"A simple error in the telephone number or passcode can doom a remote meeting before it begins."

Success Begins with the Meeting Announcement

Any meeting announcement needs to clearly state the location and starting time. Similarly, remote participants need clear instructions on how to access the meeting and when. Participants in face-to-face meetings can generally ask for directions if the announcement is unclear. Or the meeting leader can send a search party for late arrivers frantically trying to find a poorly marked conference room. No such remedies are available for remote meetings. A simple error in the telephone number or passcode can doom a remote meeting before it begins.

Provide Reliable Access to the Meeting

There is obviously no need to select a meeting location for remote meetings, but there are equivalent and important considerations. For example, the dial-in service and collaboration software, if any, must be reliable and capable of handling the anticipated number of participants. It must also be available for the required duration, and restricted to the intended meeting. We are all familiar with the confusion that results from two groups trying to use the same conference room at the same time. But it hardly compares to the havoc resulting from two groups trying to use the same call-in number at the same time.

Starting a Remote Meeting Requires Special Attention

This is due in part to the absence of the visual cues that signal a face-to-face meeting is ready to start. For example, it is obvious when the participants in a face-to-face meeting enter the room and sit down. Some are early, some are late. Some immediately begin talking, some enter quietly. Some sit down immediately, others chat quietly with friends or pour a coffee. Some are well-prepared with notes, others are consulting PDAs desperately trying to recall the purpose of the meeting.

But the remote meeting leader must confirm everybody is present and ready to begin audibly. I typically do a roll call of expected participants, asking each person to respond individually. Or I read the list of people who have introduced themselves, and then ask, "Is anybody else on the call?" I then confirm everybody has access to the agenda and other documents. This may be as simple as confirming everybody received the documents emailed in advance. But if we are using collaboration software, it is usually necessary to step through the procedure for accessing the materials.

Facilitating a Remote Discussion Requires Similar Attention to Cues

These cues would be obvious if the meeting were face-to-face. For example, it would be helpful to know if somebody "leaves the room" or otherwise checks out of the discussion. It would also be useful to know if people are shaking their heads in disagreement, or if the shy participant is frantically motioning to say something. There is no effective way to do this, in my experience, except to periodically stop and specifically ask each participant to respond. Most collaboration software has a feature enabling the participants to express their

emotions, but most people use it only when prompted by the facilitator.

Providing visual props during remote meetings is essential. Even the most patient participant will lose track of the conversation during a long telephone call. The ideal visual aid is an outline, PowerPoint slides for example, controlled by the facilitator using collaboration software. If the meeting is being conducted without collaboration software, the visual aids must be sent to each participant in advance. The facilitator should constantly check that everybody is "on the right page." I generally say something like: "We are looking at slide six. Is there anybody who does not have slide six?"

Use Remote Meetings as Platforms for Facilitating Decisions

Remote meetings are best for updates and information sharing, but it is possible to effectively facilitate decisions with a little planning. Generally, the meeting leader needs to clearly state the proposed decision and then separately poll each participant for concurrence. Normally, there will be a range of responses, requiring the facilitator to restate the proposal and repeat the process. Several iterations may be required before a consensus is achieved. I usually confirm decisions by restating the conclusion as it will appear in the meeting notes and asking the participants to express any objections.

It Is Important to Record Follow-up Actions and Responsibilities

Gaining commitment to follow-up actions is never easy, of course, but tends to be particularly tricky in remote meetings. The ideal solution is to use collaboration software with a whiteboard as a means of recording the follow-up actions and responsibilities. (A Word or Excel document viewed through NetMeeting works equally well.)

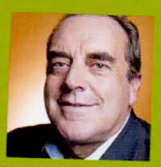
But if the meeting is being conducted without collaboration software, the leader must review each follow-up action explicitly, even painstakingly. I generally note follow-up actions throughout the meeting and use the last few minutes to confirm and finalize. I read each action and name the person I think owns the responsibility. When the person accepts, I validate by asking for a completion date. All the normal rules for assigning follow-up actions apply, of course. One, and only one, person must be responsible for each action, and assigning an action to somebody not present is akin to assigning it to nobody.

Document the Results

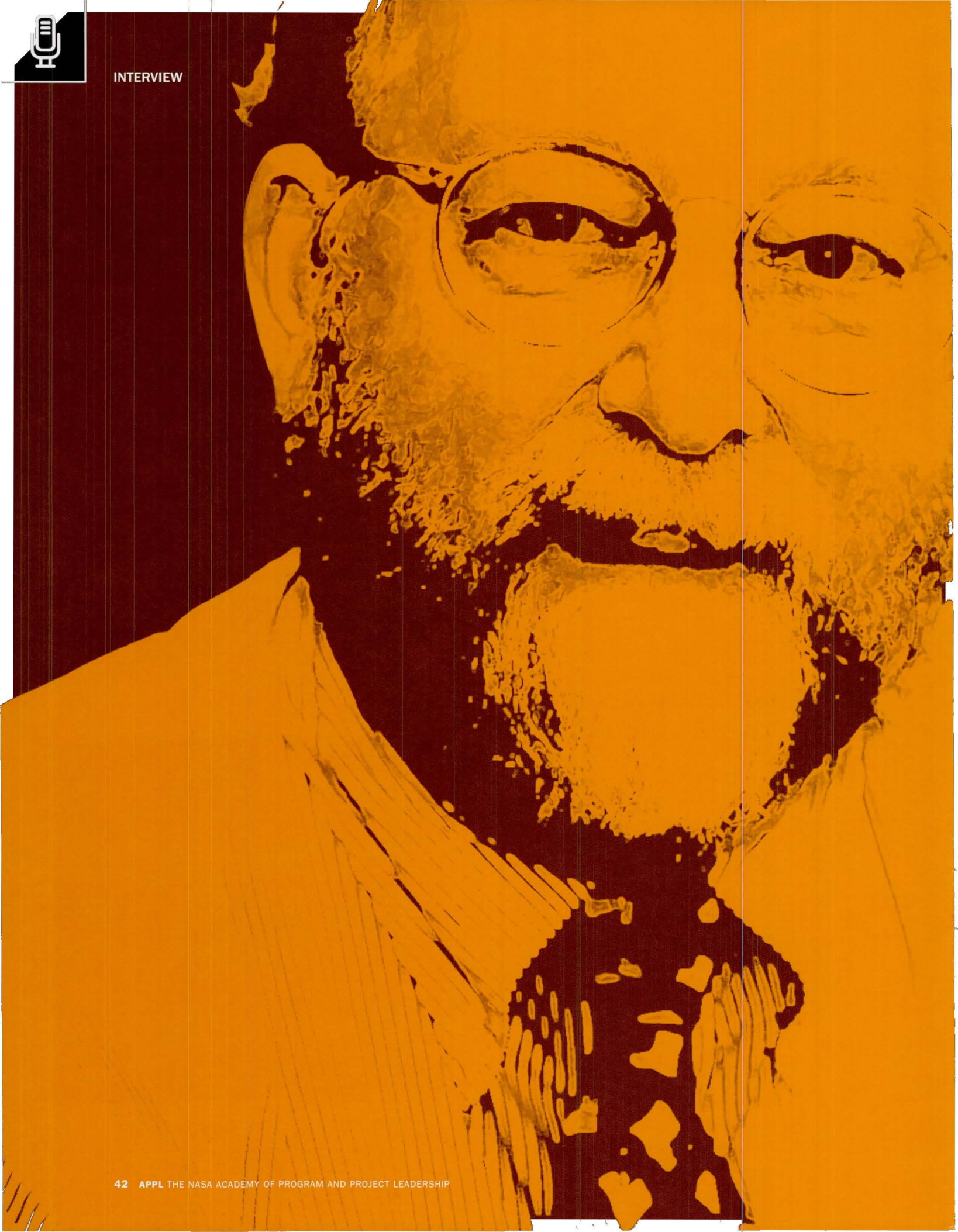
Documentation is good practice for any meeting, but it is essential for remote meetings. It is far too easy to misread the participants' reactions without being able to observe their body language. *Did Mary drop out of the call because she lost interest, or because her cell phone died? Did Alfonso accidentally drop the phone, or throw it down in disgust? And who was that snoring anyway?*

I make it a habit to issue meeting notes within 24 hours, preferably in the body of an email message (not as an attachment) to maximize the chance of it being read immediately. And I limit the meeting notes to the critical items I want to be sure we've agreed to, generally under just two headings: Conclusions and Follow-up Actions. If there is a need to inform others of what happened at a meeting, I do that separately. Confirming the participants have a common understanding of the outcome is absolutely essential to moving forward in a trustful environment, and it should never be confused with sharing the results with non-participants.

I frequently hear complaints that remote meetings are ineffective. But in my experience, they can be just as effective as face-to-face meetings for most purposes. They just require more preparation. But with careful planning, and a little practice, you too will find yourself reminding people to "publish the call-in numbers." •



HUGH WOODWARD concluded a 25-year career with Procter & Gamble in January 2004. He spent 13 years as a program manager in both manufacturing and business services environments at P&G, leading teams focused on operational and process improvement. He is now working with Macquarie Business Concepts to advise clients on approaches to achieve their strategic goals through the application of effective project portfolio management processes.



ASK talks with

Bill Townsend

Recently retiring from his position as Deputy Director of NASA's Goddard Space Flight Center in Greenbelt, Maryland, Bill Townsend is now the Vice President and General Manager of Civil Space Systems of Ball Aerospace and Technologies Corporation. Prior to his assignment to Goddard in 1998, Mr. Townsend had served as the Deputy Associate Administrator (Programs) for the Office of Earth Science since 1993. For a 20-month period beginning June 1996, he was also the acting Associate Administrator for the Enterprise.

Mr. Townsend also held other key positions within NASA, including the title of Deputy Director of the Earth Science Applications Division and the Chief of the Flight Programs Branch. He began his tenure at Wallops in 1963, and in addition to being recognized with various prestigious service awards, has been involved with close to sixty launches during the course of his NASA career. His story about the Aura launch was recently published in *ASK 20*.

You recently had a story about your experiences with the Aura launch published in* ASK. *One of the most valuables lessons that came from it was the importance of listening to minority opinion.

People need to recognize how important it is to listen to minority opinions. It doesn't mean you have to agree with them, but they should be heard. And this needs to happen at all levels of the organization. In this particular case, I had to seek out the minority opinion. When I heard that it might have some legitimacy, I wanted to hear more and take the time to discuss what was being said.

I was asking, "Why are we seeing these things so late in the game?" Allegedly, we'd never seen them before, so why were they coming up in the launch sequence? It turned out that they had been there all along, but we hadn't seen it in the data. It was the dissenting opinion that caused us to go back and look at the test data again.

If you are lower down in the organization, sometimes it's hard to raise your hand and say, "We've got a problem here." It is the same kind of thing that was discussed in the CAIB report. You've got people who are afraid that they are wrong, and they don't want to be embarrassed in front of their peers. That's why at Goddard we always insist that there are senior people onsite, involved, and ready to act for all our launches to make sure that no viewpoint gets overlooked.

This story, especially in reference to the CAIB report, reinforces the importance of establishing a culture that respects minority opinion.

Sure, because sometimes it's tempting to ignore the small voice. People get caught up in what I call "launch fever." Regardless of what's going on, people just want to launch. They get caught up in the quick tempo of things during the countdown.

This discussion where I was able to elicit the dissenting opinion took place only an hour before launch—which is the height of "launch fever." It was a case where senior management had to step in and make a decision. So I decided to stop the launch.

You've been involved with almost sixty launches, over half of which were at Goddard. Were there any other times when you had to make the tough decision of postponing a launch?

Another situation was a NOAA launch some years ago. It was an entirely different situation, but as we prepared for launch, there were issues that needed to be resolved.

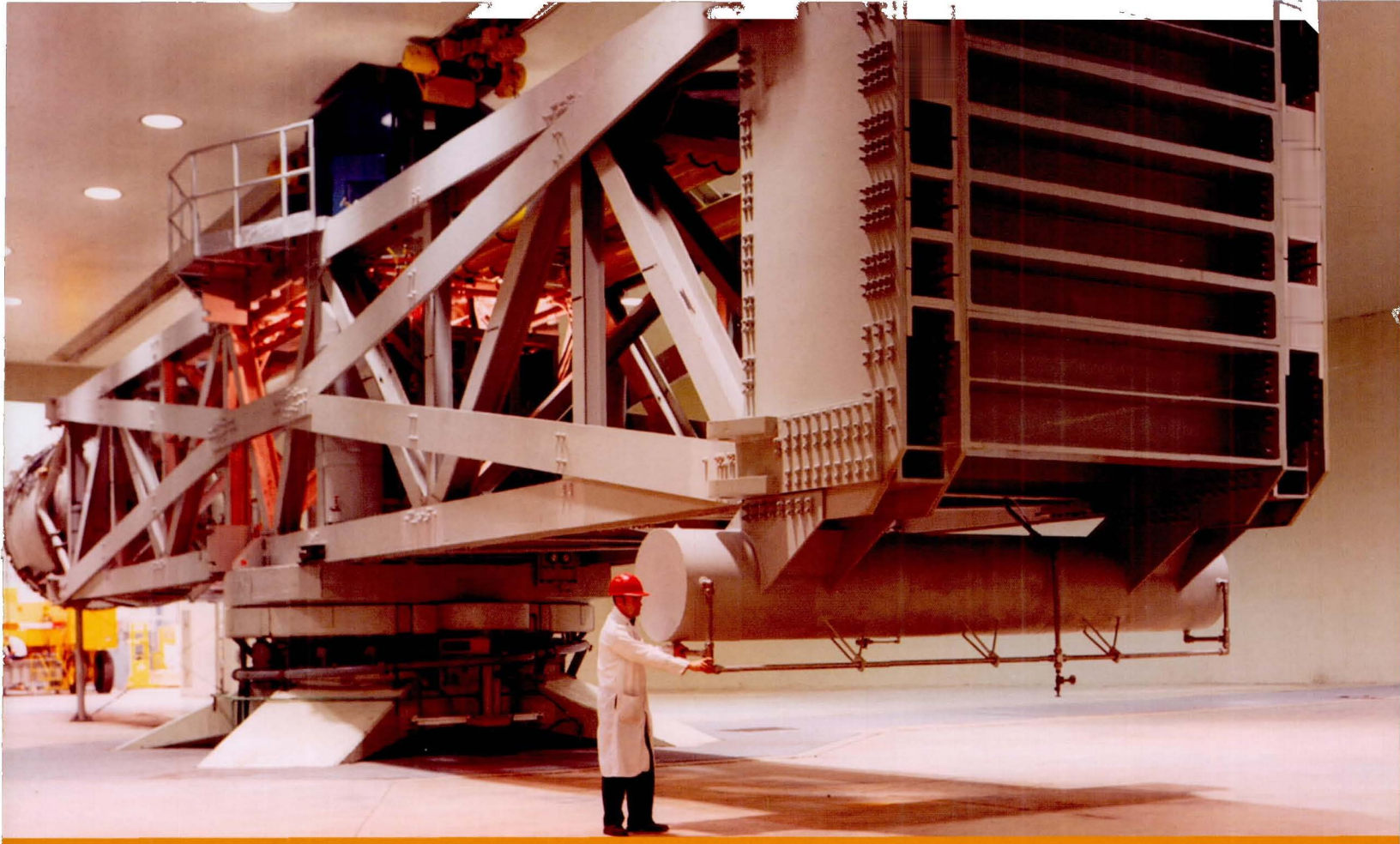
During launch countdowns, I typically keep five or six channels open so I can hear what is going on across the board. Those almost sixty launches you mentioned have taught me that when everything is going well, the net is really quiet. When things aren't going well, people are talking constantly. In this particular case, there was chatter all over the place. As the countdown continued, it only got worse. It got down to about ten minutes, and I just had a gut instinct that we needed to stop the launch and assess where we were. So I did.

We fixed our problems and launched the next night without any issues. It's tough, but as a manager you have to hold out against "launch fever." I have a motto I follow, which I've adopted from the wine industry: "No launch before its time."

What can you conclude from these cases regarding risk and decision making during a launch?

It is a real fallacy that it is possible to drive risk to zero. Anybody who thinks that there is no risk in this business, has never worked in this business. Everything we do has residual risk associated with it. Senior Management has

"I will take real, live experience any day of the week over a textbook, or classroom-type training."



Goddard Space Flight Center's launch phase simulator.

to make judgment calls. They have to ask, "Is the risk low enough that we can go forward with this? Do we have a reasonable chance at being successful?"

For example, in a perfect world, people would say that you don't launch until you find the flashlight. But we held a full investigation: tracked people down as far as Holland, looked at photographic evidence—even checked the trash dump to see if we'd accidentally thrown it away. The spacecraft was the size of a small school bus, and the flashlight was a little penlight. When it came down to it, I thought the evidence was overwhelming that the flashlight was not on the spacecraft, so I decided to launch.

Your decision turned out to be the right one, since the launch was ultimately a success. Have you ever made decisions on a project that you later wished you'd done differently?

Yes. There was a program called the Advanced Airborne Flight Experiment Program (AAFE). I proposed an aircraft instrument development effort, it was selected, and it came out very well. Then I proposed to augment the system. It is, in my opinion, one of my more notable career failures that I could never get this augmentation to work.

Probably what happened is that I was so deep in the forest that I couldn't see my way out for the trees. I really needed somebody to have said, "Give it up. This is good money after bad. You're not going to get anywhere."

Then again, I don't think you can become a top-notch project manager who is recognized as somebody to emulate without having made some mistakes. A classroom definitely doesn't provide everything you need to know to be a good project manager.

What kind of role, then, do you think that training and certification of project managers plays?

I will take real, live experience any day of the week over a textbook, classroom-type training experience. Don't get me wrong: Training has its place. It's important, there is no doubt about that. But you can't become a project manager by going to a class. There has to be a balance.

Is there an Apprentice Program at Goddard so people can get that important hands-on experience?

We are part of NASA's Summer High School Apprenticeship Research Program (SHARP) which allows students the opportunity to become apprentices to scientists and engineers at various centers across the country.

For our in-house employees, the kinds of experiences that build good project managers are different for each person. Sometimes we let people learn on smaller projects as a training ground. Or we might let them work on a larger project, but under a more experienced Project Manager.

They've got to have the opportunity to learn the whole experience. I think we grow people at Goddard very well, partly because we have so many opportunities for our people. At any given time we have about three dozen missions in formulation, two dozen in active development, and another couple of dozen in operations. There is a wide breadth of activity here. The main thing we've tried to continually work on is to grow people into being able to successfully assume positions associated with all stages of a project.

Do you think that it is important to have an open-door management style so that people can get the support they need beyond training an experience?

Absolutely. And then it's the management's job to provide the support needed along those lines. I never turn down requests for that kind of consultation, and people know I'm willing to do that. When people give me feedback about how my advice helped them, it reinforces my motivations for giving it.

Not too long ago there was a person who came to me that was interested in becoming a project manager.

The Aura Launch at Vandenburg Air Force Base.



I told him that I didn't think he was ready. I said, "I just don't think you've had the right experiences yet to be put into that position." So I told him I'd like him to be a Deputy Project Manager on a larger project than the one he wanted to manage himself. I said, "Do that for a year or two, and we'll talk about a project management assignment."

That's an important management role: evaluating people and assessing their needs and capabilities, and then placing them in a situation where they can get the necessary tools and experience.

When you think back on your career at NASA, can you think of anyone who mentored you?

Well, I came to NASA right out of high school. I had no interest at the time in going to college, so I went into an Electronic Technician Apprentice Program. I did well in the program, and I got noticed by the Wallops Flight Center Director at the time, Bob Krieger. He encouraged me to go to college and helped me understand the importance of an education. I completed the Apprentice Program and got an electrical engineering degree from Virginia Tech.

When I got back to Wallops, Bob Krieger was still the Center Director. Around 1970, he set up a small group to do space-borne radar development. Back then Wallops didn't do a lot of development work, but he saw some opportunities there and knew he had people whose talents could be directed towards it.

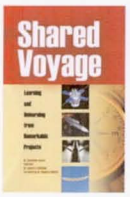
I was only six months out of college, and I got in at the ground floor of this group. We build three successful space-borne radar systems before I left Wallops to go to NASA Headquarters. For me, Bob Krieger was the most instrumental person in my career. I've had other folks who have played a significant role in advancing my career, but without Bob Krieger, it wouldn't have mattered. He took an interest in me and spent the time to help me understand my potential.

Is there a specific moment that you remember about your first job in a project management capacity?

When I was at Wallops, I was Experiment Manager for the SeaSat Radar Altimeter, which launched in 1978. I was sitting here at Goddard in "Building 14" at a console in the Control Center on the second floor. I gave the command personally to turn this particular instrument on, and then all the various parameters came up on the screen. It worked, and I was elated. It was an experience I'll never forget. •



Shared Voyage: Encouraging Unlearning



In recent years, more and more leaders of private and public organizations alike have realized that knowledge is the chief asset of organizations and the key to maintaining a sustainable and competitive advantage. Organizational learning means the continuous acquisition and testing of experience and the transformation of that experience into knowledge that is made accessible to everyone within the organization.

However, creating a "learning organization" is only half the solution. In addition to the familiar "learning curve," companies should establish a "forgetting curve," which is the rate at which a company can unlearn those habits that hinder future success. Pursuing unlearning, however, is not easy. First, very often people are simply unaware of the need to unlearn (e.g., they are unaware that the old assumptions regarding the world have changed), and, second, it is always difficult to undergo a change.

The following examples, taken from *Shared Voyage*, show just how difficult it can be. *Shared Voyage: Learning and Unlearning from Remarkable Projects* focuses on four projects: the **Advanced Composition Explorer (NASA)**, the **Joint Air-to-Surface Standoff Missile (U.S. Air Force)**, the **Pathfinder Solar-Powered Airplane (NASA)**, and the **Advanced Medium Range Air-to-Air Missile (U.S. Air Force)**. Each project is presented as a case study comprises stories collected from key members of the project teams. The book which was co-authored by A. Laufer, T. Post and E. Hoffman, was recently published by the NASA History Office. One of the main objectives of the book is to encourage unlearning of outdated concepts.

Sometimes it takes another person to help you change your mind-set. During the integration and test phase of the Advanced Composition Explorer (ACE) project, the Applied Physics Laboratory (APL) fell behind. NASA Project Manager Don Margolies thought that the way to deal with it was to order their team to work either weekends or double shifts. But Mary Chiu, APL Project Manager, was steadfastly opposed to telling her people to work overtime. Her people were salaried, and she wasn't going to order them to put in more hours.

They argued about it for a while, finally asking the Chief Engineer at APL to join them for a meeting of minds. Don hoped that meeting would not turn into a very divisive discussion. What happened instead was that Mary pointed out something to Don that he realized should have been a no-brainer. In fact, it was then so obvious to him that he was embarrassed that he hadn't realized it himself. "All we have to do is make it known that we are behind schedule," Mary said. "Professionals don't have to be reminded that they have a job to do... they will rise to the challenge on their own."

Realizing she was right, Don went back and told NASA management what Mary had said. She couldn't put the extra hours on the schedule, but she'd assured him that the work would get done. Ultimately, they recovered the lost time. Don knew that Mary had taught him a lesson in basic psychology: it's always better to let people come up with a good idea and implement it, than for you to force it down their throat.

At times, the role of leaders is to help their team change their mind-set. During source selections for the Joint Air-to-Surface Standoff Missile (JASSM) project, Air Force Program Director Terry Little told the team that he wanted this phase to be completed in six months. Truth be told, he would've been happy with seven, or even eight—but he wanted to set almost unrealistic goals. Why? "I didn't want a schedule that the team felt they could achieve just by working weekends or figuring out a handful of inventive ways to do things," he said. "I wanted something so outrageous that it would cause them to at first, give up—and then, to step back and examine their assumptions, their beliefs, everything they'd learned from past experiences and ask themselves with a clean slate: what do I really need to do to achieve this goal?"

And that's exactly what they did. The team actually completed the source selection in *five* months. "When we talked about it afterwards," Terry said, "the team discovered that they hadn't known how capable they

could be if they just quit thinking about things in the way they had always thought of them."

Of course, sometimes teams are not ready to think of things in new ways. The Advanced Medium Range Air-to-Air Missile program had been around for 20 years, and Program Director Judy Stokley knew it was time for a major reform.

It wasn't easy because of the type of partnership her team had with the contractor. If the contractor needed to change something, he had to submit an Engineering Change Proposal, and the government had to approve it. The contractor documented every change in parts, down to the lowest-level nut, bolt, or screw, and sent change proposals all day long. The government paid him to make those changes, or they didn't get done. Judy used to say, "If I want my contractor to flush the toilet in Tucson, I have to write him a contract letter and pay him to do it."

She wanted very much to change that mindset, and get the contractors to have a "heart and soul" relationship with their products. If they could write a good, simple set of performance specifications that the contractor would control, and the government would pay a fair price for the product, Judy believed it could be a win-win situation for both sides.

But she also didn't want any claims against her. The program had been under litigation for one thing or another since it started. When Judy took over as the Program Director, there were twelve standing requests for equitable adjustment filed by the contractors. She told the contractors straight out that she couldn't team with people who filed claims against her. She told them, "I'm going to help you pay for everything, I'm going to help you make a decent profit, and you are going to make sure that we have a good product out there."

At a meeting, she laid out all her plans for reform to the contractor, and at first she was met with a lot of nodding heads. Then, the contractor's Chief Engineer stood up and addressed his Vice President, "Boss, I've got to make sure that before you agree to this, you understand what she's saying. Because if you do, I don't think there's any way you'll agree to it."

That's when the room became extremely tense. "Right now," the same contractor continued, "if we change something, the government pays. She's telling you that from now on if we change something, we pay." From that moment on, it was clear that the contractors would not embrace any type of change. Judy felt the urge to laugh out loud; the attitude of those in the room was indicative of the same problems plaguing the industry.

Then, as a result of a merger with another company, the Vice President was replaced. The new leader was able to see the opportunities of Judy's reform plans, and together they transformed the mind-set and behavior of their teams.

Even though it may be difficult to convince others to "unlearn" old habits, the hardest thing can be to "unlearn" your own. In this issue of *ASK*, John DelFrate's article mentioned former AeroVironment Project Manager Ray Morgan and his struggle to overcome his tendency to micromanage. After managing a solar-powered flight project on which the young test pilot was nearly killed, Ray says he became "exactly the kind of boss that I said I would never be."

Staying on at AeroVironment, he was working what should have been "the ultimate job." And yet some days he felt so much stress on the drive to work that he almost threw up. He tried to control every aspect of his projects, working up to 100 hours a week himself, and killing the morale of everyone he worked with. He had to control everything; nothing happened without his approval. People who had been so grateful to come to work for him were burned out in two or three years. He knew he'd have to either quit or find a solution.

Around this time, Ray's wife saw a PBS special on Edward Deming, who had a revolutionary approach to management. He talked about incorporating "The Golden Rule" and the Scientific Method into your style. It was the first philosophy that really spoke to Ray, so he decided to take a night class at UCLA on the same topic.

He saw his professor's teaching style that utilized the brains of the classroom, and he began to reflect on how he could do this within his own projects. He began the difficult task of "letting go" and admits that at first it was terrifying. But by the time he joined the ERAST team to develop Pathfinder, he says, "I was not only a different man, but a better manager. I had finally begun to be a leader, and was leading my division in a transformation that enabled me to draw full value from all of the brains of my workforce."

Whether the concepts conveyed through these examples call for **learning** (that is, adding on new concepts), or for **unlearning** (that is, letting go of some old concepts), depends to a great extent on the set of beliefs that the particular project participant (or reader) has developed throughout his/her experience. One thing, however, is clear. Today, in our competitive and dynamic environment, everyone is expected to unlearn, and quite often. New ideas are breaking traditional molds and updating old axioms: "Live and *unlearn*." "Gone *and* forgotten." •